

Index

Symbols

2 Pages graph layout problem, definition 1120
 2-D data representation, definition 1438
 2D objects with GNG 1365
 2-D representation, solar radiation data 1433
 2D-PAGE analysis 1583–1588
 2Pages graph layout problem 1117
 3D deformable model, definition 630
 3D object recognition (3DOR) 248
 3D reconstruction tests 843

A

absorbance, definition 588
 ACO 1531
 acoustic attenuation spectrum, definition 1302
 acoustic systems, optimization of 1296
 action planning 1549
 action planning, definition 1554
 active appearance models (AAM), definition 630
 active interactive genetic algorithms (aiGAs) 788
 active learning 1, 1383
 active learning, with SVM 1–8
 active model, definition 553
 actuators, definition 955
 adaptation 592
 adaptation, definition 470
 adaptive business intelligence 16–21
 adaptive computation paradigm 9
 adaptive geometric computing 9
 adaptive neural algorithms 22–30
 adaptive neuro-fuzzy systems 31–36
 adaptive rule-driven devices 37

adaptive spatial memory (ASM) 9
 adaptive system, definition 580
 adaptive technology 37–44
 adaptivity 37
 additive monotonic cooling 346
 ad-hoc networks, evolutionary computing approach 589
 ad-hoc networks, swarm intelligence approach for 1530
 admissible alternative, definition 436
 advanced cellular neural networks image processing 45–50
 affectation step, definition 1251
 AGALZ 1316
 agent applicability 952
 agent autonomy, definition 955
 agent based mode, definition 1237
 agent based query answering system 925
 agent learning process 928
 agent percepts, definition 955
 agent taxonomy 941
 agent typology 941
 agent, definition 513, 931
 agent-based modeling 51–57
 agents, types of 951
 agglomerative hierarchical clustering 231
 AI 918
 AIBO, definition 630
 aIGA weight tuning 788
 air flight control, definition 540
 ambient intelligence (AmI) 85
 ambient intelligence (AmI) environment 92–98
 ambient intelligence (AmI), in elderly healthcare 94
 ambient intelligence (AmI), in tourism 94
 ambiguous grammar, definition 773
 AmI, in vehicles and transports 94
 analogic cellular computer 45
 analytic modelling 969
 angiographies 110–117
 angiographies, and image segmentation 110–117
 ANN 1358, 1360, 1361, 1568
 ANN application 1605
 ANN development with genetic programming 619
 ANN development, evolving graphs 618
 ANN model 1603
 ANN simplification, evolving graphs 618
 annotation, definition 342
 ANNs design, evolutionary approaches for 575
 ANNs modeling, mathematical framework for 1057
 ANNs modeling, mathematical methods for 1059
 ANNs output combination 556
 ANNs, need of use 1358
 ANOVA 304
 answer set programming (ASP) 1373
 ant colony algorithm 242
 ant colony optimization, definition 1535
 AntHocNet 1532
 AntHocNet, definition 1535
 anti-granulometries 1107
 architecture, definition 1017
 area of the search space, definition 493
 arrhythmia, definition 916
 ART (adaptive resonance theory), definition 1496, 1503
 ART, definition 1242
 articulation ontology, definition 499

artificial cell, definition 382
 artificial embryogeny model 378
 artificial embryogeny, definition 382
 artificial intelligence (AI) 71, 85, 92, 125, 327, 941
 artificial intelligence (AI) methods 188
 artificial intelligence, and breakwaters 144–150
 artificial intelligence, and computer-aided diagnosis 157–160
 artificial intelligence, and education 138–143
 artificial intelligence, and information retrieval 151–156
 artificial neural network (ANN) 639, 1417
 artificial neural network (ANN), development 125–130
 artificial neural network (ANN), labelled directed graph 639
 artificial neural network (ANN), types of 643
 artificial neural network design 575
 artificial neural network, definition 559, 588, 607, 923, 1011, 1017, 1120, 1204
 artificial neural networks 875, 167
 artificial neural networks (ANNs) 192, 580, 624, 933, 938, 962, 1063, 1210, 1212, 1438, 1608
 artificial neural networks, field of structural concrete 118–124
 artificial neural networks, mathematical modeling of 1056
 artificial neural networks, modularity 1095
 artificial neuroGlial networks 167–171
 artificial vision 367, 547
 artificial vision techniques 384
 ASIC, definition 839
 association rule 76
 association rule mining 172–178
 association rule mining (ARM) 76–84
 association rules, definition 890
 association rules, types of 175
 associative memory 248–255
 astrocytes 168
 asymptotic stability, definition 1224
 atrial fibrillation, definition 916
 attractor, definition 1271
 attribute reduction, definition 1403

attribute, definition 890
 attributive operator, definition 1165
 authorization certificate 1406
 automated brute force attacks 187
 automated cryptanalysis, of classical ciphers 186–191
 automated negotiation threads 1418
 automated negotiation, definition 1424
 automated negotiations 1524–1529
 automated visual inspection (AVI) 206–210
 automatic configuration 399
 automatic evaluation systems 139
 automatic infant cry recognition (AICR), definition 866
 automatic signature verification, definition 1237
 automatic speech recognition (ASR) 101
 autonomous robotics 603
 autonomous robotics, definition 607
 autonomous vehicles, neural control system for 1197
 autoregressive models, definition 630
 AutoTutor 1182

B

back propagation algorithm 508, 832, 866, 938, 962, 1008, 1128, 1210, 1237, 1608
 backpropagation through time 1417
 backward chaining, definition 994
 backward elimination strategy, definition 545
 backward elimination, definition 882
 Bayesian image modeling 224
 Bayesian inference method 1333
 Bayesian inference, definition 1335
 Bayesian methods 1330
 Bayesian MLP learning 1486
 Bayesian networks (BNs) 68
 Bayesian neural networks, definition 815
 Bayesian theory, definition 1040
 behaviour based robotics, definition 607
 behaviour-based clustering 231–235
 belief maintenance systems 330, 333
 belief set, definition 1355
 belief, definition 1355
 beliefs, definition 1374, 1431
 best practice, definition 535
 bicoherence, definition 1271

bilateral negotiation, definition 1424
 bilateral negotiations, and neural networks 1524
 binary chromosome, definition 872
 binary decision diagrams (BDDs) 1549
 binary hierarchical clustering 290
 binary languages, definition 1172
 binary relation, definition 708
 binary representation 796
 binary space partitioning, definition 815, 823
 binary spatter codes (BSC), definition 519
 binary symmetric relation, definition 708
 binding occurrences, definition 1165
 binding, definition 519
 bioinformatic methods 1338
 bioinformatics 1065, 1337
 bioinformatics 236–240, 241–247
 bioinformatics, definition 1070, 1342
 bioinformatics, prototype based classification 1337
 bio-inspired algorithms 238, 595
 biomarker, definition 1342
 biomedical image analysis 710, 711
 biomedical imaging 372
 biomedicine 236
 biometric data processing 12
 biometric security 262–269
 biometric system, definition 1265, 1453
 biometrics 262–269
 biometrics, and security 265
 biometrics, traits of 263
 Blackboard, definition 486
 blind source separation 369
 bootstrap, definition 566
 bootstrapping, definition 470
 BP algorithm, architecture 837
 breakwaters 144
 British National Corpus (BNC), definition 1567
 bundling, definition 519
 business intelligence 16
 BYY harmony learning, definition 901

C

camera calibration, definition 847, 852
 cancer data 1205
 cancer databases 1589

cancer, definition 1594
 careers paths, definition 1035
 CART 438
 cart-centering 819
 case-based reasoning, definition 995
 catadioptric camera, definition 852
 catchment area, definition 1190
 Cauchy-Schwartz distance, definition 909
 causal rejection principle 1371
 causal rejection principle, definition 1374
 causation 68
 cellular automata 354
 cellular automata modelling of complex systems 355
 cellular automata, modeling of complex systems 353
 cellular automaton, definition 359
 cellular cycle, definition 382
 cellular neural network 45–50
 cellular neural network (CNN) 218–222
 cellular neural network (CNN), feed-back-driven 220
 cellular neural network (CNN), isotrophic model 219
 cellular neural networks 206
 cellular neural networks image processing, advanced 45–50
 central catadioptric camera, definition 852
 central nervous system (CNS) 304–311
 centroid, definition 436
 CHAID 438
 change-point, definition 1003
 chaos, definition 1272
 chaotic neural networks 275–281
 chemometrics, definition 666
 chemometrics, functional dimension reduction 661
 CHENN model 391
 Chomsky hierarchy 597
 chromosome, definition 574, 595
 chronic renal failure (CRF) 71
 ciphers 179
 circuit, definition 479
 circumscription 330
 class-based language models 1467, 1469
 classical ciphers 186–191
 classical conditioning, definition 1204

Classification 886, 888
 classification module 556
 classification process 556
 classification system 1451
 classification system, definition 1453
 classification, definition 802, 962
 classifier, definition 371
 classifier, definition 890
 CLB, definition 839
 cleanup memory, definition 519
 clinical proteomics 1337
 clinical proteomics, definition 1342
 closed-world assumption, definition 995
 closure problem, definition 773
 cluster analysis 289
 cluster analysis, definition 1350
 cluster analysis, of gene expression data 289–296
 cluster head, definition 758
 cluster, definition 1218, 1231
 cluster-based architecture, definition 758
 clustering 67, 297, 887, 888
 clustering analysis 297
 clustering, agglomerative hierarchical 231
 clustering, behaviour-based 231–235
 clustering, binary hierarchical 290
 clustering, definition 595, 891
 clustering, hierarchical 289
 clustering, self-splitting 291
 clustering, traditional 299
 Cocke-Younger-Kasami algorithm 597
 code bloat, definition 773
 code mobility 1406
 code security 1406
 cognition 340
 cognition, analyzing of 256–261
 cognitive agents 87
 cognitive modelling, and ANNs 161–166
 cognitive psychology, definition 342
 collaboration and communication mechanisms 983
 collaborative learning environment, definition 1282
 color spaces, definition 388
 combinational network 611
 combinatorial optimization 344
 commonsense and expert systems 334

commonsense business knowledge 334
 commonsense knowledge base implementations 335
 commonsense knowledge base, definition 336
 commonsense knowledge representation 334
 commonsense knowledge representation formalisms 328
 commonsense knowledge representation i-formalisms 327
 commonsense knowledge, definition 333, 336
 commonsense representation 334
 commonsense representation formalisms 327
 commonsense, definition 327
 commonsense, importance of 327
 communication & collaboration tool, definition 988
 competitive layer, definition 1231
 complete fuzzy rule base, definition 733
 completely minimitive ranking function, definition 1355
 complex network, definition 359
 complex systems 51, 359
 complex systems, cellular automata modelling of 355
 complex systems, definition 1063
 complex-valued neuron 361
 compositional structure, distributed representation of 514
 computational complexity theory, definition 1023
 computational dynamics, definition 1120
 computer aided diagnosis (CAD), definition 375
 computer game, definition 535
 computer model, definition 535
 computer morphogenesis 377
 computer vision 383
 computer-aided diagnosis, and AI 157–160
 computerized tomography (CT) 372
 computing-accelerated 875
 concept lattice structure 80
 ConceptNet 335
 ConceptNet, definition 336
 condition attribute, definition 702
 conditional hazard estimating neural networks 391

conditional ranking function, definition 1355
conditioned response (CR), definition 1204
conditioned stimulus (CS), definition 1204
condor, definition 1210
confidentiality, definition 1329
configuration 396
configurational energy, definition 1465
connectionist cognitive modelling 162
connectionist system 167
connectionist, eliminative 163
connectivity phenomena, definition 1172
consistency techniques, definition 409
consistency theorem 1353
constrained optimisation problem (COP), definition 409
constraint satisfaction problem (CSP), definition 402, 409
constraint, definition 409, 513
context aware techniques, definition 500
context-free grammars (CFG) 767
continuous recurrent neural networks 256
control parameter, definition 493
control rule, definition 1028
conventional mathematical modeling, definition 553
convergence, definition 773
converging mapping, definition 1350
convex and normal fuzzy (CNF) set, definition 733
cooktop design goals 1569
cooktop design, optimization of 1570
cooling schedules, for simulated annealing 344–352
cooperation with metaheuristics, approaches for 480
cooperation, definition 858
cooperative multi-search metaheuristics 481
cooperative multi-search metaheuristics, definition 486
corporate memory 983
corpus validation 541
corpus, definition 1472
corpus, production of 542
correlation, definition 795

correlation-based feature selection, definition 559
correntropy, definition 909
correspondence problem, definition 1190
cost function 1297
cost function, definition 1101, 1302
cost function, definition 574
countably minimitive ranking function, definition 1355
counting (exhaustive), definition 479
crisp set, definition 973
crossover 593
crossover operator 650
cross-over, definition 595
crossover, definition 653, 758
cross-validation (CV) 68
cross-validation, definition 524
cryptanalysis 179–185, 186–191
cryptanalysis, automated 179–185
CUDA, definition 1503
cumulants, definition 1231, 1272
curse of dimensionality 65
curse of dimensionality, definition 666, 1087
Cyc 335, 336
CYK, definition 602
cytoplasm, definition 382

D

data acquisition 1448
data classification 796
data mining 172
data mining algorithm, definition 1329
data mining tasks, incorporating fuzzy logic 884
data mining technique, definition 1329
data mining, definition 423, 486, 787, 802, 891, 1135, 1211
data partitioning 428
data preprocessing module 555
data routing 1534
data visualization, definition 423
data warehouse data modeling 425
data warehousing design methodologies 424
data warehousing development 424
database binary representation, definition 802
database repairs 1428
data-centric approach (DCA), definition 1329

data-driven sub-word units 1469
DEBBIE system 139
decision attribute, definition 702
decision fusion, definition 1335
decision making in intelligent agents 431
decision support and analysis (DSA) 992
decision support systems (DSSs) 992
decision support systems, personalized 1310–1315
decision tree 545, 882, 886
decision tree, definition 436, 702
decision trees, and CRM 438
decision trees, and data modelling 437–442
decision variable, definition 409
deduction rules 778
deep knowledge, definition 995
default reasoning 330
default reasoning, definition 1040
defect detection 132, 211
defect detection, real time 211
defect tolerance 1557
deformable finite element model 550
defuzzification 970
defuzzification, definition 695, 973, 1128
defuzzification, definition 727
degree of disbelief, definition 1355
degree of entrenchment, definition 1355
degree of truth, definition 727
DEGREE system 139
degrees of freedom problem, definition 470
delayed duplicate detection, definition 505
delta test, definition 666
dependency grammar 449
dependency parsing 449–455
dependency treebanks 451
dependency trees 450
dependency, definition 1184
derived predicate, definition 1028
DES state 677
description logic (DL) 402, 497
designed of experiments, definition 1574
detection, definition 962
developmental robotics 464
device, definition 479
differential evolution 488

- differential evolution with self-adaptation 488
- differential evolution, definition 493
- differential evolution, related work to 489
- diffusion constant, definition 1465
- diffusion of innovation 53
- diffusion process, definition 1465
- digital circuits, evolved synthesis of 609
- digital signal processing (DSP), definition 795
- dilation, definition 388
- dimensional model, definition 430
- dimensionality reduction methods 1045
- dimensionality reduction, definition 638
- dimensions, definition 430
- diphone, definition 795
- direct on-chip implementation strategy 836
- DisCOP, definition 513
- discredibility detection 567
- discrete events systems, definition 687
- discrete recurrent network for optimization 1112
- DisCSP, definition 513
- disk-based search 501
- dispositional models 331
- dispositional models, definition 333
- dissimilarity data, definition 1251
- dissimilarity data, self-organizing map 1244
- dissimilarity SOM, definition 1251
- dissimilarity, definition 566
- distubutional equivalency, definition 1035
- distributed configuration 401
- distributed constraint reasoning 507, 509
- distributed representation of compositional structure 514
- distributed representation, definition 519
- distributed representation, varieties of 515
- diverging mapping, definition 1350
- DNA computing 1174
- DNA micro-array, definition 1070
- DNA, definition 382
- document clustering (DC) 655
- document management, definition 988
- domain independent planner, definition 1028
- domain of variable, definition 409
- domain pruning, definition 409
- dominance, definition 1196
- driver support system (DSS) 554
- Drools 1404
- DSHP 828
- dual (lattice), definition 1242
- duality, definition 1110
- duplicate detection scope 503
- duplicate elimination scope, definition 1554
- DyCoN, definition 1218
- DyCoNG, definition 1218
- dynamic adaptation module 856
- dynamic appraisal, a robot model 1376–1382
- dynamic associative memory (DAM) 248
- dynamic reconfigurable circuit 612, 614
- dynamic scheduling systems, definition 859
- dynamic scheduling, hybrid meta-heuristics based system 853
- dynamical recurrent neural networks, definition 1158
- E**
- EA multi-model selection 521
- EA multi-model selection for SVM 520
- e-commerce, and intelligent software agents 940–944, 945–949
- edge detection 373
- edge detection, definition 375
- education in knowledge society 532
- efficiency metrics 510
- Eigenface, definition 371
- e-learning 339
- e-learning in new technologies 532
- e-learning, definition 535
- electric load forecasting 813
- electricity load prediction 1514
- electrocardiogram, definition 916
- electroencephalography (EEG), definition 375
- element, definition 1101
- elitism 594
- elitism, definition 1150
- embedded agents 87
- embodiment, definition 470
- emergence, definition 360, 470, 1063
- energy function, definition 1120
- energy minimizing active models 547
- energy parameters, definition 758
- e-note-taking 337
- ensembles, definition 1158
- entailment, definition 1184
- entity-relationship data model, definition 430
- environment, definition 1093
- epistemic logic, definition 1094
- equivalence, definition 1374, 1431
- erosion, definition 389
- error backpropagation, definition 580
- error function, definition 676
- error threshold, definition 479
- evolution process 604
- evolutionary algorithm (EA), definition 525, 604, 608, 1017, 1150, 1158, 1196
- evolutionary algorithms in discredibility detection 567
- evolutionary algorithms, definition 580, 795, 1048, 1594
- evolutionary algorithms, multi-objective 1145
- evolutionary approaches to variable selection 581
- evolutionary artificial neural networks 576
- evolutionary artificial neural networks, definition 580
- evolutionary computation (EC) 624, 767, 875, 1583–1588
- evolutionary computation (EC) field 744
- evolutionary computation (EC) techniques 647
- evolutionary computation, definition 493, 580, 602, 624, 807, 859, 872, 1144, 1309
- evolutionary computing 10
- evolutionary grammatical inference 596
- evolutionary learning algorithms 1014
- evolutionary mechanism, definition 1302
- evolutionary optimisation 1042
- evolutionary optimization method 522

evolutionary programming, definition 1144
 evolutionary robotics 603, 604, 608, 1101
 evolutionary techniques 588, 648, 653
 evolutionary techniques, variable selection 581
 evolutionary time, definition 574
 evolvable hardware 614, 616
 evolved synthesis of digital circuits 609
 exclusion error 1357
 executive information systems 1310
 expansion operator 600
 expansion, definition 1374
 expectation, definition 1184
 expected value, definition 436
 expert combination 318
 expert knowledge, definition 336
 expert systems 1404
 expert systems, commonsense 334
 explanatory variables, definition 423
 exploitation, definition 1196
 exploration, definition 1196
 exploratory data analysis, definition 787
 extended Kalman filter 1417
 extension aware techniques, definition 500
 extensivity, definition 1110
 external memory breadth-first search 502
 external memory heuristic search 503
 external memory search algorithms 502

F

F1-measure, definition 545
 face detection, definition 1265
 face identification, definition 1265
 face recognition 248, 1455–1461
 face recognition, definition 371
 facial expression recognition 625
 facial expression recognition system, definition 630
 fact table, definition 430
 factor analysis, definition 901
 factored-state Markov decision process, definition 830
 factors, definition 1574
 fan-in, definition 479

fast correlated-based filter (FCBF) method 634
 fault-tolerant, definition 479
 feature extraction 202, 1449
 feature extraction problem, definition 1190
 feature extraction, definition 1454
 feature extraction, definition 371, 638
 feature selection 66, 632
 feature selection, definition 371, 559, 638
 feature selection, definition 916, 1237
 feature space, definition 560
 feed forward off-chip implementation 834
 feed-forward artificial neural network 639–646
 feed-forward artificial neural network, definition 1011, 1017
 feed-forward artificial neural networks 1004, 1012
 feedforward neural networks, definition 1395
 field programmable array (FPGA), definition 560
 field programmable gate array (FPGA) 555
 filling factor, definition 1302
 filter method, definition 638
 finite automata, definition 602
 finite element method, definition 553
 FIPA, definition 923
 first-order method, definition 1011
 first-order predicate calculus 334
 FIS, definition 1242
 FischerTechnik system 1385
 fitness function 756, 1303
 fitness function, definition 595
 fitness function, definition 758, 872, 1309
 fitness landscape, definition 1150, 1196
 fitness, definition 773, 1150, 1196
 fixed point theorem, definition 1224
 fixed search 584
 flexible manufacturing system (FMS) 749
 flexible query, definition 931
 flocking, definition 540
 Floreano, Dario 605
 FOCUS 634
 fonator system 1439, 1445

forward chaining, definition 995
 forward selection strategy, definition 545
 forward selection, definition 882
 Foundation for Intelligent Physical Agents 1405
 Fourier transform (FT) 223
 FPGA implementation of ANNs 831
 FPGA, definition 839
 frames 329
 Fraunhofer AIS, Germany 1385
 frequency domain stability inequality of Popov, definition 1224
 frequent item-sets, discovery of 77
 frequent item-sets, generating 77
 FTS engine interface 657
 FTS engine, structure of 656
 full adder, definition 1480, 1561
 full factorial design, definition 1574
 full-text search 656
 full-text search (FTS) engine, definition 660
 full-text search engines 654
 functional data analysis, definition 666
 functional dimension reduction 661
 functional equation, definition 676
 functional imaging 372
 functional network, definition 676
 functional networks 667
 fusing variables, definition 1517
 fusing variables, definition 462
 fuzzification 970
 fuzzification, definition 695, 718, 766, 973, 1128
 fuzzy algorithm, definition 718
 fuzzy approximation of DES state 677
 fuzzy ART equations 1492
 fuzzy ART neural network stream processing 1491
 fuzzy ART training process 1492
 fuzzy ART, definition 1496
 Fuzzy ART, definition 1503
 fuzzy clustering algorithms 711
 fuzzy c-means (FCM) 711
 fuzzy compositional rule of inference (CRI), definition 733
 fuzzy control, definition 695
 fuzzy decision trees 696
 fuzzy inference system 1124
 fuzzy inference systems, definition 718, 823

- fuzzy k-nearest neighbour (FKNN) 711
- fuzzy logic 31, 330, 710, 797, 884
- fuzzy logic estimator 719
- fuzzy logic in data mining tasks 884
- fuzzy logic systems, supervised learning of 1510
- fuzzy logic, definition 462, 687, 695, 727, 802, 816, 891, 973, 1128, 1237, 1496, 1517
- fuzzy matching, definition 660
- fuzzy membership function, definition 695
- fuzzy neural networks (FNN) 32
- fuzzy operator, definition 718
- fuzzy petri nets, definition 687
- fuzzy relational neural network (FRNN), definition 866
- fuzzy rule base, definition 462, 1517
- fuzzy rule interpolation 728
- fuzzy rule interpolation methods 729
- fuzzy rule interpolation, definition 733
- fuzzy rule, definition 742, 1128
- fuzzy set theory, definition 780
- fuzzy set, definition 695, 708, 802, 973
- fuzzy similarity calculation 800
- fuzzy similarity for data classification 796
- fuzzy similarity representation 798
- fuzzy similarity representation, model for 798
- fuzzy SQL query, definition 932
- fuzzy SQL, definition 931
- fuzzy system (FS), definition 766
- fuzzy system, definition 695, 742, 1129, 1403
- Fuzzy systems 884
- fuzzy systems, multilayer optimization approach for 1121
- fuzzification, definition 727
- G**
- game-based learning 140
- games theory, definition 1023
- gas-fired cooktop burners 1568
- gas-fired cooktop burners, thermal design 1568
- gate (logic), definition 479
- Gaussian distribution, definition 1087
- Gazetteer, definition 1567
- gene expression 236, 241
- gene expression data, cluster analysis 289–296
- gene expression, definition 1211
- gene finding 237
- gene mapping 242
- gene regulation network use 744–747
- gene regulatory network 237
- gene, definition 382, 1595
- generality 334
- generalization, definition 1523
- generalized cellular automaton, definition 359
- generalized constraint language 777
- generalized constraints 777
- generalized cylinder (GC) 114
- generalized theory of uncertainty (GTU), definition 780
- generalized-regression (GR) NN, definition 1424
- generation, definition 1150, 1196
- generative topographic mapping (GTM), definition 795
- generic gate 614
- genes, definition 595
- genetic algorithm 592, 653, 742, 766, 807, 916, 1101, 1302, 1335, 1488
- genetic algorithm, with division into species 651
- genetic algorithms (GA), definition 616
- genetic algorithms (GAs) 647, 748–754, 1504
- genetic algorithms components, definition 1517
- genetic algorithms components, definition 462
- genetic algorithms, definition 758, 859, 872, 1237
- genetic fuzzy rule generator architecture 457
- genetic fuzzy system 762
- genetic fuzzy system, definition 766
- genetic fuzzy systems, ports and coasts engineering 759
- genetic networks 242
- genetic operators 599
- genetic operators 762
- genetic operators, performance effect of 1504–1509
- genetic pool 650
- genetic programming (GP) 241, 527, 598, 619
- genetic programming, definition 773, 916
- genetic regulatory network model 745
- genome encoding 762
- genotype, definition 617, 624
- geodesic active contour model 549
- geodesic curve, definition 553
- geriatric residences, planning agent for 1316–1322
- GGGP systems, crossover operator 769
- Gibbs sampler, definition 1465
- global classification 1359
- global constraint, definition 409
- global path planner, definition 1079
- global path planners 1072
- global stability, definition 1224
- GNG, definition 1218
- gold-silver price, definition 1003
- GP 590
- GP GPU (general-purpose computation on GPUs), definition 1496, 1503
- GPU (graphics processing unit), definition 1496, 1503
- gradient descent 1417
- grammar evaluation 600
- grammar genetic programming approach 599
- grammar-guided genetic programming (GGGP) 767
- grammar-guided genetic programming, definition 773
- granular computing 774, 775
- granular computing, definition 780
- granulometries 1107
- graph edge, definition 1079
- graph invariant, definition 709
- graph node, definition 1079
- graph partition problem 1115
- graph subsumption, definition 1184
- graph, definition 505
- graph, definition 709
- graphics processing units (GPUs) 873–878
- greedy algorithm, definition 546
- greedy search, definition 883
- gross errors, definition 1395
- growing cell structures 782
- growing cell structures visualization 781
- growing cell structures, definition 787

growing neural gas (GNG) 1364
 growing neural gas, definition 1368
 GTM user modeling 788

H

HAM-PHAM 828
 hardware genetic algorithm (HGA)
 612
 harmony search (HS) 803
 harmony search model and application 803
 harmony search, definition 807
 Harris corner detector, definition 389
 HCI applications 625
 health care agent, nature-inspired
 1317
 Hebbian learning, definition 1368
 heterogeneous multi-core computing,
 definition 1503
 heuristic function, definition 506
 heuristic information, definition 1535
 heuristic knowledge, definition 995
 heuristic modelling 968
 heuristic, definition 486, 602, 1023,
 1465
 HEXQ 828
 HGA, definition 617
 Hidden Markov Model 1565
 Hidden Markov Model (HMM), definition 630, 1567
 hierarchical fuzzy logic systems 456
 hierarchical fuzzy logic systems,
 definition 463, 1517
 hierarchical neuro-fuzzy systems
 808, 817
 hierarchical reinforcement learning
 825, 830
 hierarchical task decomposition,
 definition 830
 high level synthesis, definition 839
 holographic reduced representation
 (HRR), definition 519
 holonomic robot, definition 847
 homogeneous multi-core computing,
 definition 1503
 HOPS 840, 841
 HOS 1226
 HOS, definition 1231, 1272
 Human Genome Project 236
 human-computer interaction (HCI),
 definition 631
 human-machine interaction 628
 hybrid algorithm 636
 hybrid dual camera systems 849

hybrid dual camera vision system
 840
 hybrid intelligent system, definition
 866, 872
 hybrid intelligent systems 854
 hybrid intelligent systems, definition
 859
 hybrid meta-heuristics based scheduling system 855
 hybrid method, definition 638
 hybrid methods 636
 hybrid methods, definition 1079
 hybrid navigation 1076
 hybrid omnidirectional pin-hole sensor (HOPS) 841
 hybrid perspective 1589
 hybrid scheduling module 856
 hybrid space, definition 1595
 hybrid spaces 1589
 hybrid two-population genetic algorithm 585, 649
 hybridization, definition 780
 hypergraph, definition 709

I

ICA model 22–30
 idempotence, definition 1110
 IFIP framework 968
 IF-THEN rules, definition 727
 ill-posedness, definition 375
 image - video face recognition 1457
 image analysis, definition 1309
 image analysis, particle swarm optimization 1303
 image integration 373
 image integration, definition 376
 image moments, definition 389
 image pre-processing 1448
 image pre-processing, definition
 1454
 image processing, definition 973
 image rectification 384
 image restoration, and Bayesian neural networks 223–230
 image segmentation 373
 image transformation, definition
 1110
 image-based visual homing 1185,
 1190
 immersive technologies 536
 immune artificial system 238
 impact-echo 192–198, 199–205
 implementation, definition 336
 implicit hybridization 1194

imprecise marking, definition 687
 inclusion error 1357
 increasingness, definition 1111
 incremental learning operator 600
 independence assumption 880
 independence subspaces, definition
 901
 independent component analysis
 (ICA) 270–274, 883, 1265
 independent subspaces 892
 indexer, definition 660
 individual, definition 493, 574
 induction, definition 703
 infant vision system 248
 inference network, definition 995
 inflective language, definition 1472
 inflective languages, statistical modelling of 1467
 information extraction (IE) 106,
 1567
 information pattern, definition 1218
 information potentials and forces,
 definition 909
 information processing, definition
 342
 information quality decay, definition
 423
 information retrieval, and AI 151–
 156
 information retrieval, definition 423
 information theoretic learning (ITL)
 902
 information theoretic learning, definition 909
 initial annealing temperature, definition 574
 initial population 592
 input data selection 578
 insect behaviour 1537
 instance, definition 891
 institutional memory, definition 988
 intelligence, definition 939
 intelligent agent, definition 51, 431,
 535, 932, 1431
 intelligent MAS 917
 intelligent query answering mechanism 924
 intelligent radar detectors 933, 934,
 935
 intelligent software agent, and e-commerce 941–944
 intelligent software agent, definition
 955

intelligent software agents 951
 intelligent software agents, and e-commerce 945–949
 intelligent software agents, applications in focus 950
 intelligent system 51
 intelligent systems 257
 intelligent traffic sign classifiers 956
 intelligent tutoring system (ITS), definition 1257
 intelligent tutoring system, definition 1184
 intelligent tutoring systems 138
 intelligent tutoring systems, NLP techniques in 1253
 intelligent voltage instability detection system 1597
 Intellimetric 139
 intension aware techniques, definition 500
 interactive configuration 401
 interactive systems, and uncertainty 963–966
 interactive systems, managing uncertainties 1036
 interconnect challenges 1558
 internal robotics 1376
 international arbitrage, definition 1003
 international bimetallism, definition 1003
 international monetary system, definition 1003
 interoperability, definition 1282
 intron, definition 773
 intuitionistic defuzzification 970
 intuitionistic fuzzification 970
 intuitionistic fuzzy components, modification of 970
 intuitionistic fuzzy image processing 967
 intuitionistic fuzzy index, definition 973
 intuitionistic fuzzy set, definition 973
 inverse perspective mapping 843
 inverse perspective mapping (IPM), definition 847
 inverted index, definition 660
 isomorphic (function), definition 1243
 isomorphic graphs, definition 709
 iSTART 1182
 iteratively reweighted least squares (IRL), definition 1144

J

Jacobians, definition 1087
 job arrival integration mechanism 857
 job elimination mechanism 857
 joint belief distribution 436
 joint camera calibration 843
 JONSWAP spectrum, definition 1608

K

Karhunen-Loeve, definition 553
 k-cross-validation, definition 560
 kernel density estimate, definition 909
 kernel estimator, definition 1350
 kernel machine, definition 1523
 kernel methods, definition 1523
 kernel trick, definition 1523
 kernel, definition 566
 kernelized fuzzy c-means (KFCM) 712
 KFM, definition 1218
 KGP agents 88
 KGP model 88
 Khepera robot 821
 Kirchhoff's Laws 1357
 k-lines 331
 K-nearest neighbour (KNN) 241
 K-NN, definition 566
 knowledge based robotics, definition 608
 knowledge discovery in databases (KDD), definition 891
 knowledge discovery, definition 487
 knowledge engineering 106
 knowledge engineering, definition 540
 knowledge extraction process 483
 knowledge extraction, definition 487, 588, 939
 knowledge management systems, procedural development 975–981
 knowledge management tool, definition 988
 knowledge management, definition 535, 988
 knowledge processing 926
 knowledge reduction, definition 1403
 knowledge society 532
 knowledge visualization, definition 787
 knowledge, definition 988

knowledge-based system, definition 995
 knowledge-based system, types of 990
 knowledge-based systems 989
 Kohonen maps 996
 Kolmogorov-Sinai entropy, definition 1272
 Kripke model, definition 1093
 Kullback Leibler distance (KL-distance), definition 1257

L

labeled transition systems, definition 1093
 Lagrange multiplier, definition 676
 LAMP 1612
 language model, definition 1472
 language recognition 179
 latent semantic analysis (LSA) 1254, 1257
 latent semantic analysis, definition 1184
 lattice gas automata, definition 360
 lattice theory, neural/fuzzy computing 1238
 lattice, definition 1111, 1243
 leaf node, definition 703
 learn to learn, definition 535
 learning (training) rule, definition 1063
 learning algorithm, definition 676, 1011, 1017
 learning algorithms for recurrent networks 1412
 learning design, definition 1282
 learning domain models 1026
 learning domain-specific planners 1025
 learning machine, definition 1466
 learning objects, definition 1282
 learning process 532
 learning rule optimization 577
 learning search control 1025
 learning stage, definition 866
 learning, active 1
 learning, game-based 140
 learning, mixed active 5
 learning, RETIN active 4
 learning, supervised 282
 learning-based planning 1025
 least mean square error reconstruction (LMSER), definition 901

least squares support vector machine, definition 666
 least trimmed squares estimator (LTS) 1390
 least-squares algorithm, definition 742
 LEGO Group 1385
 LEGO MINDSTORMS robots 1385
 lens distortion, definition 847
 lesson learned, definition 988
 levels, definition 1574
 Levenberg-Marquardt algorithm, definition 939
 leverage points, definition 1395
 lexical processing 106
 linear discriminant analysis (LDA) 367
 linear equation, definition 676
 linguistic similarity techniques, definition 500
 linguistic term, definition 703, 727
 linguistic variable, definition 703, 780
 linguistic variables, definition 727
 linked concepts 172
 local classification 1358
 local maxima finding, definition 1350
 local minima, definition 1079
 local navigation methods 1074
 local navigation methods, definition 1079
 local search, definition 602, 1196
 logic of actions, definition 1094
 logic of knowledge, definition 1094
 logic of time, definition 1094
 logic program, definition 403
 logic programming 991
 logistic models, definition 333
 logistic regression, definition 1144
 logistic representations 330
 look ahead, definition 409
 LSA cosine, definition 1258
 LS-SVM 664
 LTS algorithm 1390
 LTS error function 1389
 Lyapunov exponents, definition 1272
 Lyapunov function, definition 1224

M

machine learning (ML) 71, 423, 554, 560, 666, 816, 823, 1567
 macro-action, definition 1028

macroevolutionary algorithm, definition 608
 MAGE, definition 1070
 MAGE-ML, definition 1277
 MAGE-OM, definition 1277
 MAGE-stk, definition 1277
 magnetic resonance imaging (MRI), definition 376
 magnetoencephalography (MEG), definition 376
 majority (gate), definition 479
 Mamdani fuzzy rule-based system, definition 766
 Mamdani inference method 813
 Mamdani inference system, definition 766
 Manhattan distance, definition 1079
 many-objective problem, definition 1048
 many-valued logic 1610–1614
 mappings between ontologies 494
 marginal belief distribution, definition 436
 marked graph, definition 687
 Markov Chain Monte Carlo (MCMC), definition 1488
 Markov decision process, definition 830
 Markov decision processes (MDPs) 825, 826
 Markov process, definition 1035
 Markov switching model, definition 1003
 Martin, F. 1383
 MAS 918
 mass customization, definition 403
 mass spectrometry, definition 1342
 mass spectrometry, wavelet transformation in 1338
 MaxCut problem, definition 1120
 maximum entropy 1564
 maximum entropy model (MEM), definition 1567
 MaxQ 828
 MDS, definition 566
 medical image, definition 718
 medical images 1583
 Mel Feature Cepstral coefficients (MFCC), definition 795
 membership function, definition 703, 709, 718, 727, 780, 802, 974, 1129
 membrane computing 1174
 membrane systems 1174
 memory and learning 1056
 memory hierarchy, definition 506
 memory organization packets (MOPS) 331
 Mercer's kernel, definition 1523
 metacognition, definition 342
 metadata, definition 1282
 metaheuristic, definition 487
 meta-heuristics 854
 metaheuristics, definition 807, 859
 meta-heuristics, definition
 metric-drive design, definition 430
 Metropolis-Hastings algorithm, definition 1489
 MGED, definition 1070
 MIAME, definition 1070, 1277
 micro-array data integration 1065
 micro-array data sources 1065
 microarrays 65, 1277
 microarrays, ontologies for 1273
 microarrays, processing patterns for 1273
 microstructure, definition 617
 middle-agents, definition 955
 minor component (MC), definition 901
 minority-3 gate, definition 1480
 Minority-3 Gate, definition 1561
 mirror to camera positioning 842
 mismatch, definition 1481, 1561
 mixed active learning 5
 mixture-of-expert (ME) models 318
 MLP learning, stochastic approximation Monte Carlo 1482
 mobile ad-hoc network, definition 595
 mobile agent (MA) 1616
 mobile code 1406
 mobile robots localization 1072, 1080
 mobile robots mapping 1072, 1080
 mobile robots navigation 1072, 1080
 modal analysis, definition 553
 modal logics 1089
 model checking problem, definition 1094
 model checking, definition 1554
 model checking, definition 506
 model evidence, definition 1489
 model functioning 379
 model selection, definition 525
 model-based reasoning, definition 995
 modelling, definition 360

- modified fuzzy c-means 712
 modified PSO equations 1305
 modular neural networks 1096
 modularity 1096
 modularity in artificial neural networks 1095
 modularity, implementing 1097
 modularity, strategic and tactical 1097
 modularization, definition 1101
 molecular syntax 1174
 Mondada, Francesco 605
 monotonicity, definition 333
 Monte Carlo simulations, definition 1481, 1561
 Monte Carlo, definition 479
 Moore's gap 1503
 morphological filter, definition 1111
 morphological filtering, principles of 1102
 morphological filters, basic 1106
 morphological operators, definition 389
 morphological processing 106
 morphological pyramids 1108
 MOS transistors 1475
 MREM 1112
 multi agent systems 924
 multi-agent system 52
 multi-agent system (MAS), definition 955
 multiagent system, definition 923, 1094
 multi-agent systems (MASs) 952
 multi-agent systems, definition 859
 multiagent systems, modal logics for reasoning 1089
 multiairity relation, definition 709
 multi-class combination scheme, definition 525
 multilateral negotiations, and neural networks 1526
 multi-layer perceptrons (MLPs), definition 580, 1424
 multi-layered concept models 1132
 multi-layered data model, definition 1135
 multi-layered nature of human recognition 1132
 multi-layered schemas 1131
 multi-layered semantic data models 1130
 multi-layered semantic models 1131
- multi-level morphological filtering 1108
 multilogistic regression 1137
 multilogistic regression by product units 1136
 multimodal problems 648
 multimodal problems, characterization of 647
 multimodal problems, definition 653
 multimodal problems, solutions with GA 647
 multi-modal system, definition 1265
 multimodality, definition 342
 multi-model optimization problem 521
 multi-objective algorithm, definition 1595
 multi-objective evolutionary algorithms 1145
 multi-objective optimization 1590
 multi-objective optimization, definition 1150, 1158, 1196
 multiple correlation, definition 1574
 multiple dam scheduling 803
 multiple dam scheduling, definition 807
 multiple dam scheduling, harmony search for 803
 multiple layer perceptron (MLP), definition 1489
 multiple testing 66
 multiplexing (von Neumann), definition 479
 multiplicative monotonic cooling 345
 multi-scale transformation, definition 1111
 multivalued discrete neural model, definition 1120
 mutation 593
 mutation operator 651
 mutation, definition 595
 mutation, definition 653, 758
 mutual information projections, definition 909
- N**
- Naïve Bayes classifier, definition 883
 Naïve Bayes classifier, improving 879
 naïve physics 334
 Naïve-Bayes, definition 546
 named entities 106
 named entity annotation 106
 named entity recognition (NER) 1562
 nanoscale CMOS, definition 1481, 1561
 narrative information, definition 1172
 narratology, definition 1172
 n-ary languages, definition 1172
 NASA Robotics Alliance Project 1384
 Nash equilibria, non-cooperative games 1018
 Nash equilibria, software agents 1019
 Nash equilibrium, definition 1023
 natural language processing 1173–1178
 natural language processing 334
 natural language processing (NLP) 795, 1562, 1567
 natural language processing, definition 1184
 natural language understanding and assessment 1179
 natural language understanding and assessment, definition 1184
 natural languages 1174
 navigation, definition 1190
 negation, strong 1610
 negative filtering 180
 negative test predicate 180
 negotiation protocol, definition 1424
 negotiation strategy, definition 1424
 Nelder-Mead evolutionary hybrid algorithms 1191
 network lifetime, definition 758
 network visualization 782
 networks of evolutionary processors 1175
 neural architecture 1417
 neural classifier, definition 1496
 neural classifier, stream processing of 1490, 1497
 neural controller, definition 1101
 neural MREM model 1113
 neural network (NN) 554, 1424
 neural network based visual data mining 1205
 neural network framework (FNN) 32
 neural network, definition 1335, 1403
 neural network-based process analysis 1212
 neural networks and HOS 1226

neural networks, definition 423
 neural networks, in automated negotiations 1524–1529
 neural networks, multi-objective training 1152
 neural/fuzzy computing 1238
 neural-fuzzy systems (NFS) 32
 neurocomputing, and rich dynamics 275
 neuro-fuzzy system, definition 1403
 neuro-fuzzy technology 31
 neuro-fuzzy, definition 923
 neuromorphic modeling 223
 neuron model 639
 neuron model, definition 1017
 neuron modeling 1057
 neuron, definition 1481, 1561
 neurons 1558
 neutral decision, definition 1362
 new technologies feature 534
 new technologies proposal 533
 new technologies, definition 535
 new technologies, e-learning in 533
 Neyman-Pearson detectors 934
 n-gram model, definition 1472
 NKRL inference engine, definition 1166
 NKRL inference rules, definition 1166
 NKRL templates, definition 1165
 NLP techniques 1253
 NNs, learning techniques of 1435
 node, definition 703
 Nogood, definition 513
 noise 99
 noisy test categorization 100
 noisy text 99, 105
 noisy unstructured text data I 99–104
 non-cooperative facial biometric identification systems 1259
 non-cooperative games, definition 1023
 non-cooperative identification system, definition 1265
 non-membership function, definition 974
 non-monotonic adaptive cooling 347
 non-monotonic logic 331, 333, 1041
 non-monotonic reasoning paradigm 1370
 non-rigid objects 1363
 non-rigid objects, definition 1369
 note-taking techniques 337
 NP-hard problems, definition 1023

O

OAA approach 557
 object representation, definition 1369
 object tracking, definition 1369
 objective fitness function 592
 objective function, definition 1151
 odometry, definition 1087
 off-chip training, definition 839
 off-line system, definition 1454
 off-line writer identification system 1448
 Ohm's Laws 1357
 omnidirectional camera, definition 852
 omnidirectional vision 849
 on-chip training, definition 839
 one against all (OAA) model 556
 one against all approach, definition 560
 online learning, definition 1028
 online noisy documents 99
 on-line system, definition 1454
 ontologies for education 1278
 ontologies for learning design 1278
 ontology 1283–1289
 ontology alignment 1283–1289, 1290–1295
 ontology alignment systems 1285, 1290–1295
 ontology alignment techniques 1290–1295
 ontology alignment, definition 500
 ontology integration, definition 500
 ontology language, definition 1282
 ontology mapping techniques 495
 ontology mapping, definition 500, 1054
 ontology mediation, definition 500
 ontology merging, definition 500
 ontology of concepts, definition 1166
 ontology of events, definition 1166
 ontology, definition 923, 1054, 1071, 1135, 1277, 1282
 OpenCV 1584
 operant conditioning, definition 1204
 optic flow, definition 1190
 optical character recognition (OCR) 105, 231
 optical devices 131
 optimal 2-D linear prediction filter design 1434
 optimal coefficient linear filters, definition 1438

optimal matching, definition 1035
 optimality, conditions of 1043
 optimality, definition 513
 optimization problem, definition 487
 optimization, definition 807
 Oracle Text 657
 organizational intelligence 51
 orthogonal least squares (OLS) algorithm, definition 1362
 orthonormalization 663
 oscillations, definition 1225
 outlier, definition 1395
 out-of-vocabulary rate, definition 1472
 over-constrained equations, definition 1350
 over-fitting, definition 666
 OWL, definition 1135

P

Papert, S. 1383
 paradigm of ANNs, definition 1063
 paragliding simulator 538
 parallel & high-intensive computing nature 875
 parallel computing 873
 parallel genetic algorithm 1298
 parallel hybridization 1193
 parallel metaheuristics, definition 487
 parallel processing 428, 945
 parameter control 488
 parameter identification, definition 742
 parameter tuning 488
 parameter variations, definition 1481, 1561
 pareto front, definition 1048
 pareto optimal solution, definition 1048
 pareto set, definition 1048
 particle swarm optimization (PSO) 1584
 particle swarm optimization, definition 1309
 particle swarm optimization, image analysis 1303, 1304
 pasta segmentation 1306
 path, definition 703
 pattern classification 813
 pattern database, definition 1554
 pattern packing, definition 1554
 pattern recognition 110, 423, 816, 1358

- pattern, definition 962
 payoffs, definition 1023
 PCA model 22–30
 peak period, definition 1609
 pedagogical characteristic 534
 pedagogical principles, definition 343
 perceptron, definition 1481, 1561
 perceptron-based adders, statistical simulations on 1474
 perfect recall synchronous environment, definition 1094
 perfect recall synchronous system, definition 1094
 perplexity, definition 1472
 PerPot, definition 1218
 personalized decision support systems 1310–1315
 perspective reprojections 843
 petri nets, definition 687
 pharmacokinetics (PK) 71
 phase portrait, definition 1225
 phenotype, definition 617, 624
 pheromone, definition 1535
 photo-multiplier tubes (PMT) 1576
 phylogenetic trees 242
 pin-hole camera, definition 847
 pitch 1441
 pitch, definition 795
 plain conditionalization 1352
 plate detection 1307
 plateau, definition 1028
 platform, definition 343
 pointwise ranking function, definition 1355
 policy, definition 1028
 Politree partitioning, definition 823
 polyacrylamide gel electrophoresis (2D-PAGE) 1584–1588
 polyespectra, definition 1272
 population based algorithm, definition 1151
 population size, definition 574
 population, definition 574, 624
 population-based algorithm, definition 1196
 ports and coasts engineering, genetic fuzzy systems 759
 poset, definition 1243
 positive valuation (function), definition 1243
 positron emission tomography (PET) 1576–1582
 possibility theory, definition 1041
 posterior belief, definition 1087
 power network 1358, 1360
 power quality evaluation 1226
 power quality, definition 1231
 power system model 1356, 1357
 power system stability 1596–1602
 power system state estimation, definition 1362
 power system topology error, definition 1362
 power system topology model, definition 1362
 power system topology verification 1356
 power system topology verification, definition 1362
 power system topology verification, RBF networks 1356
 precision farming, definition 1144
 precision, definition 546, 1054
 predicate calculus 329
 predicted belief, definition 1087
 prediction error, definition 1438
 predictive analysis, definition 423
 pre-processing module 856
 pre-processing procedures 880
 preprocessing, definition 962
 preservation of topology, definition 1035
 principal component analysis (PCA) 368, 883, 901
 principal component analysis, definition 371, 1237
 Principle of Cognitive Scaffolding 467
 Principle of Incremental Complexity 466
 Principle of Information Self-Structuring 466
 Principle of Interactive Emergence 467
 principle of irrelevance of syntax, definition 1374, 1432
 principles for developmental systems 466
 privacy, definition 1329
 privacy-preserving data mining 1326
 privacy-preserving data mining (PPDM), motivation for 1324
 privacy-preserving estimation (PPE) 1325
 proactive forward ant, definition 1536
 probabilistic latent semantic analysis (PLSA), definition 1258
 probability density function, definition 939
 problem instance, definition 487
 product unit neural networks 1137
 product unit neural networks, definition 1144
 production rule, definition 995
 production rule-based system 396, 403, 1335
 Programmable Brick 1383
 projection, definition 436
 propositional logic formula satisfiability, definition 403
 propositional models 328
 propositional models, definition 333
 prosody, definition 795
 protein secondary structure 1331
 protein structure prediction 1330
 protein, definition 382, 1335
 proteomic data, analysis of 1340
 protocols, definition 1258
 prototype classifiers 1339
 prototype classifiers, definition 1342
 prototype, definition 1252
 pruned search 584
 PSO for object detection 1304
 PSO for object segmentation 1304
 PTZ camera, definition 852
 pushdown automata, definition 602
- ## Q
- quadtree partitioning, definition 823
 quantization error, definition 1252
 quasi ordered structure, definition 1302
 query answering, definition 932
 query processing 927
 query refinement engine, definition 660
 query, definition 932
 quiescence, definition 513
- ## R
- R, definition 1277
 radar, definition 939
 radial basis function (RBF), definition 1424
 radial basis function network, definition 1362
 radiology 157

- random deviate generation process, definition 1466
- random network, definition 360
- random sampling, definition 1350
- randomized hough transform (RHT) 1343, 1344
- ranking engine, definition 660
- ranking function, definition 1355
- ranking scheme, definition 1048
- Rayleigh wave (R-wave) 199
- RBF networks 1356
- RBF networks, learning in 1013
- RBF NN, definition 1424
- RDF, definition 1135
- reactive forward ant, definition 1536
- real time applications, updates 1427
- real-time recurrent learning 1417
- real-time system, definition 923
- recall, definition 546, 1054
- recommender system 71
- recommender system, Web 71
- reconfigurable circuit, definition 617
- reconfigurable gates network 611
- reconstructed phase space, definition 1272
- recurrent networks, architectures of 1411
- recurrent neural network (RNN), definition 1225, 1411, 1417
- recursive algorithm, definition 1087
- recursive auto-associative memory 515
- recursive auto-associative memory (RAAM), definition 519
- redundancy (factor), definition 479
- reflection, definition 1609
- regeneration mechanisms 857
- regular lattice, definition 360
- regularization, definition 1158, 1523
- reinforcement learning hierarchical neuro-fuzzy models 818
- reinforcement learning, definition 824, 830
- relational product, definition 1554
- relaxation, definition 1063
- relevance learning, definition 1342
- reliability, definition 479
- RELIEF algorithm 634
- remote sensing, application to 1140
- remote sensing, definition 1144
- Renyi entropy, definition 909
- repair inconsistent database 1428
- replacement 594
- representation formalisms, definition 333
- representation step, definition 1252
- response, definition 1574
- Rete algorithm 1404
- Rete-OO algorithm 1404
- RETIN active learning 4
- Reynolds Number(Re), definition 1575
- RHT characteristics 1345
- RHT general form 1346
- RHT mechanisms 1345
- rival penalized competitive learning, definition 901
- RL-HNFB architecture 818
- RL-HNFB learning algorithm 819
- RL-HNFP architecture 818
- RL-HNFP learning algorithm 819
- RMSE, definition 1438
- RNFS, architecture of 1397
- RNFS, supervised learning process of 1399
- RNN training 1415
- roadmaps 1073
- robot system, collision-avoidance in 459
- robotics 917
- robots, and competition 1385
- robots, and research groups 1384
- robots, in education 1383–1388
- robots, swarm 1537–1542
- robust estimator, definition 1395
- robust learning algorithm 1389, 1395
- robust LTS learning algorithm 1390
- robust statistics, definition 1395
- robustness, definition 1063
- root node, definition 703
- rough set theory, definition 780
- rough set, definition 1403
- rough set-based neuro-fuzzy system 1396, 1397, 1403
- route discovery 1532
- route maintenance 1534
- RTL, definition 839
- rubble-mound breakwater, and AI 144–150
- rule base decomposition 458
- rule base identification, issues in 460
- rule engines 1404–1410
- rule engines, and agent-based systems 1404–1410
- rule induction, definition 1243
- rule reduction, definition 1403
- rule-based systems 990, 1404
- rule-driven devices 38
- rule-driven) devices, adaptive 38
- run time reconfiguration strategy 836
- run time reconfiguration, definition 839
- S**
- SAMANN neural networks, definition 1211
- SAMC algorithm 1483
- SAMIDI 1066
- SAMIDI approach 1066
- SAMIDI software architecture 1068
- SAMIDI, data integration 1064
- SAMIDI, micro-array information 1064
- Sammon error, definition 1211
- Sarsa, definition 824
- SBS, definition 638
- scaffolding, definition 470
- scheduling problem 853
- scheduling, definition 859
- scripts 329
- search algorithm, definition 506
- search algorithms, definition 409
- search control knowledge, definition 1028
- search space, definition 493, 525, 580, 588, 602, 624, 653, 1151, 1196, 1302, 1466
- secondary population 650
- secondary structure, definition 1335
- second-order method, definition 1011
- second-order representations 433
- sectioner, definition 660
- security threats, and mobile code 1406
- segmentation, definition 376, 423
- segmentation, definition 718, 1309
- selection criteria 594
- selective pressure, definition 1048
- self-adaptation 488
- self-adaptation, definition 493
- self-adaptive control parameters 490
- self-configuration 591
- self-explanation and reading strategy trainer (SERT), definition 1258
- self-healing 591
- self-management 591
- self-optimization 591
- self-organising neural networks, definition 1369

- self-organization principle, definition 1063
 self-organization, definition 360
 self-organized criticality, definition 360
 self-organizing map (SOM), definition 1252
 self-organizing map for dissimilarity data 1244
 self-organizing map, definition 787
 self-organizing maps 781
 self-organizing maps, definition 795, 1035
 self-organizing structures 377
 self-splitting clustering 291
 self-tuning regulator, definition 923
 semantic data model, definition 1135
 semantic information management methodology (SIMM) 1067
 semantic information model methodology, definition 1071
 semantic nets 329
 semantic similarity techniques, definition 500
 semantic structure, mapping ontologies 1049
 semantic Web, definition 1054
 semi-Markov decision process, definition 830
 semiotic dynamics, definition 470
 sensor calibration 842
 sensor credibility detection method 570
 sensor credibility, definition 574
 sensor node, definition 758
 sensors, definition 955
 sequence alignment 242
 sequence processing 1411, 1417
 sequential backward selection (SBS) 638
 sequential forward selection (SFS) 638
 serial hybridization 1193
 SET, definition 1561
 SFS, definition 638
 Shafer-Dempster's evidence theory, definition 1041
 shallow knowledge, definition 995
 short message services 99
 signal models 934
 signal processing, definition 872
 signals characterization 1266
 signals characterization, nonlinear techniques 1266
 signed formulae 1426, 1428
 signed formulae, updates 1428
 significant wave height, definition 1609
 similarity measure, definition 1054
 similarity measures 797
 similarity, definition 802
 simulated annealing 344–352
 simulated annealing algorithm 344, 569, 1335
 simulated annealing, definition 1489
 simultaneous head and facial action tracking 625
 single viewpoint constraint, definition 847, 852
 six-valued logic 1610
 skeletons 111
 small-world network, definition 360
 SMDPs 826
 snapshot image, definition 1190
 social insect behaviour 1537
 social robot, definition 631
 soft computing, definition 780, 807, 872
 soft-computing, definition 916
 solar radiation data forecasting results 1435
 solar radiation data, 2-D representation of 1433
 solar radiation forecasting model 1433
 solar radiation, definition 1438
 SOM algorithm, definition 1003
 SOM batch algorithm, definition 1252
 SOM, definition 1243
 SOM, labour market data 1029
 sonic crystal, definition 1302
 sonic crystals 1297
 spam filtering 561
 sparse fuzzy rule base, definition 733
 species, definition 653
 spectrometric data 662
 spectroscopy, definition 588
 spectrum, definition 588
 speech recording 1439
 speech-based clinical diagnostic systems 1439–1446
 spelling error correction 105
 Spohn conditionalization 1353
 SPSEC algorithm 1399
 stability, definition 1225
 Stable Herbrand Model, definition 403
 standard distance-based ALSVM (SD-ALSVM) 2
 standard genetic algorithm 568
 star schema, definition 430
 state estimation, definition 687
 state machine, definition 687
 state-space generalization, definition 830
 statistical disclosure control (SDC), definition 1329
 statistical disclosure limitation (SDL), definition 1329
 statistical learning, definition 376
 stemmer, definition 660
 stereo vision, definition 852
 stigmergy, definition 1536
 stochastic approximation algorithm, definition 1489
 stochastic information gradient, definition 909
 stochastic search, definition 1466
 stochastic universal sampling (SUS) 1299
 stream processing, definition 1496, 1503
 stream programming model 874
 string similarity techniques, definition 500
 strong equivalence, definition 1432
 structural concrete field 526–531
 structural concrete, and ANN 119–124
 structural imaging 372
 structural risk minimization (SRM) inductive principle, definition 1523
 structure aware techniques, definition 500
 structure identification, definition 742
 structure preservation 1590
 structured information 106
 sublattice, definition 1243
 subharmonics 1443
 submerged breakwater domain 761
 submerged breakwater, definition 1609
 submerged breakwaters 1603
 submerged breakwaters, wave reflection 1603
 sub-swarm, definition 1309
 sub-word unit, definition 1472
 sub-word units 1468

supervised classification, definition 1265, 1454
 supervised learning 282, 816, 1517
 supervised pseudo self-evolving cerebellar (SPSEC) 1399
 support vector machine (SVM) 1–8, 525, 666, 916, 1518
 support vector regression (SVR) model 411
 surrogate fitness, definition 795
 survival analysis 390
 sustained sound 1439, 1440
 SVD, definition 566
 SVM classifiers 561
 SVM, definition 546, 566
 SVM, EA multi-model selection for 520
 SVRCACO 410
 swarm intelligence (SI) 10, 238, 1309, 1531, 1536
 swarm intelligence approach for ad-hoc networks 1530
 swarm intelligence for visualisation 537
 swarm robotics 1537–1542
 symbol grounding problem 1543–1548
 symbol grounding problem, and semiotics 1545
 symbolic breadth-first search 1550
 symbolic computation 991
 symbolic pattern databases 1551
 symbolic search 1549
 symbolic search algorithms 1550
 synchronization, definition 1225
 syntactic analysis 106
 syntactic parsing 1184
 synthetic neuron implementations 1555
 system engineering 918
 system engineering and robotics 917
 system modeling 51, 743
 system monitoring, definition 687
 system, definition 932

T

Tabu search, definition 859
 Takagi-Sugeno inference method 813
 Takagi-Sugeno method 813
 Takagi-Sugeno-Kang fuzzy rule-based system, definition 766
 temporal logic, definition 1094
 tensor products, definition 519
 test, definition 1218

text categorization (TC) 655
 text mining 654
 text normalization, definition 795
 text summarization 656
 theory of endorsement, definition 1041
 thermal equilibrium, definition 1466
 thesaurus, definition 660
 threshold based voting, definition 1350
 time reduction 876
 time-series prediction, definition 1158
 time-series, definition 1158
 tokenisation, definition 1054
 tomography, definition 376
 topology deformations 1366
 topology errors (TEs) 1356
 topology preservation, definition 1252
 topology preserving graph, definition 1369
 total least square (TLS) fitting, definition 901
 tracking, definition 553
 trade-off constant of SVM, definition 525
 traditional manner of study, definition 343
 traffic control 410
 traffic light control 458
 traffic sign pre-processing 555
 traffic sign recognition 554
 traffic sign recognition, ensemble of ANN 554
 traffic sign recognition, neural network system 555
 training algorithm 1417, 1218
 transaction identifier 173
 transfer function optimization 577
 transform domain system, definition 1265
 transient, definition 1231
 travelling salesman problem 1114, 1120
 tree augmented Naïve Bayes (TAN) 880
 tree pruning 438
 tree selection 438
 tree splitting 438
 tree-structured graph, definition 1054
 truth maintenance system, definition 1041
 TS algorithms 996

TSL color space, definition 1503
 TTS synthesis 788
 tumor prediction 304–311, 312–317
 two-phase hybridization 1192
 type, definition 1218

U

ubiquitous computing (UbiComp) 93
 UCE, definition 566
 UCI repository, definition 883
 ultra low power neurons 1556
 UML, definition 1135
 unbalance index, definition 1362
 unbalance indices 1357
 uncertainty, and interactive systems 963–966
 uncertainty, sources of 963
 unconditioned response (UR), definition 1204
 unconditioned stimulus (UCS), definition 1204
 under-constrained equations, definition 1350
 unifying information model (UIM) 1066
 unifying information model (UIM), definition 1071
 uniqueness, definition 676
 unit selection synthesis, definition 795
 unknown word, definition 1472
 unsuccessful negotiation threads (UNTs) 1422
 unsupervised learning, definition 463, 787, 795, 1595
 update process 1426
 update theory 1371
 update, definition 1375, 1432
 updates, roadmap of 1370

V

vague environment (VE), definition 733
 vague language, use of 992
 value iteration, definition 506
 Value Principle 466
 variable scaling 664
 variable selection 458
 variable selection approaches 583
 variable selection, definition 588, 666
 variable selection, evolutionary approaches to 581

variant SNR environments 719
 variant SNR environments, fuzzy logic estimator for 719
 VC dimension, definition 1523
 vector field histogram 1075
 vector symbolic architecture (VSA) 516, 519
 version space theory 1
 VHDL, definition 839
 video image post-processing 385
 video-based face recognition 1455–1461
 videometrics 389
 videometrics, definition 389
 virtual and immersive environments, definition 540
 virtual reality, definition 1211, 1595
 virtual theatres, definition 540
 virtual, definition 535
 visual data mining 1205
 visual homing, definition 1190
 visual servoing, definition 847
 visualization methods 783
 vocabulary, definition 1473
 voice quality 1439, 1443
 voltage instability detection, using neural networks 1596–1602
 voltage output image processing 1597
 von Neumann multiplexing 471
 Voronoi diagrams 12

W

wave flume 384
 wave flume experiments 383
 wave reflection at submerged breakwaters 1603
 wavelet analysis, definition 1342
 wavelet transformation, mass spectrometry 1338
 weak irrelevance of syntax (WIS) 1373
 weak irrelevance of syntax, definition 1375, 1432
 weak negation 1610
 wedgelet 223
 weight, definition 1011, 1017
 weighted clustering 592
 weights, evolution of 126
 Weka, definition 560
 wireframe model, definition 631
 wireless sensor networks (WSNs), genetic algorithms 755
 wireless sensor networks, definition 758
 wireless sensor networks, genetic algorithms 756
 WoLF, definition 824
 word matching 1254
 word matching (WM), definition 1258
 word-braker, definition 660
 WordNet 335

WordNet, definition 336
 Workflow Management Coalition (WFMC) 1615
 workflow management, based on mobile agent technology 1615–1623
 World Health Organization(WHO) 1589
 wrapper algorithm 635
 wrapper method, definition 638
 wrapper methods 635
 writer identification, definition 1454
 writer's off-line identification 1447
 WSNs, specific parameters 756

X

XML-RPC 1612

Y

Yellow Page, definition
 Yellow Pages 983, 988
 yield, definition 1481, 1561

Z

zygote, definition 382
 α -cut of a fuzzy set, definition 732
 δ band test, definition 1350
 ε -covering fuzzy partition, definition 732
 χ^2 distance, definition 1035