

## Keyword Index

3D games .....	308
abstract puzzle game .....	189
action analysis .....	405
action recognition .....	405
actor-critic .....	391
AdaBoost .....	62
adaptive algorithm selection .....	393
adaptivity .....	157
adversarial .....	157
adversarial planning .....	437
affect recognition .....	362
affective computing .....	332
agent control .....	381
agent representation .....	110
agent simulation .....	33
AI benchmarking .....	316
AI competitions .....	409
altruistic punishment .....	41
ancient games .....	490
antagonist .....	157
applied economics .....	418
applied games .....	332
artificial general intelligence (AGI) .....	1, 466
artificial intelligence (AI) .....	9, 94, 285, 381, 409, 490
artificial neural networks .....	285
assessment game .....	339
authoring tools .....	332
automated game design .....	17, 277
automated playtesting .....	141
automatic testing .....	466
autonomous drivers .....	269
balancing .....	205
beginner heuristics .....	237
belief revision .....	425
believability .....	157
believable behaviors .....	46
believable characters .....	125
breadth first search .....	425
card games .....	409
cellular automata .....	86
choice .....	339
CIG data mining competition .....	213
co-creativity .....	482

collectible card games .....	9
combinatory categorial grammars .....	437
computational creativity .....	17, 277
computational intelligence .....	277, 324, 482
computational models of emotions .....	393
computer Chess .....	70
computer games .....	285
continuous control .....	25
convolutional neural network (CNN) .....	33, 301
cooperative games .....	410, 482
creativity .....	482
curriculum learning .....	293
data mining .....	213
dataset .....	405
decision making .....	197
deck building .....	9
deep learning .....	33, 277, 383, 394, 433
deep Q-learning .....	149
deep Q-network .....	433
deep reinforcement learning .....	149, 293, 316, 387
design assistance .....	141
deterministic finite automata .....	78
digital archaeoludology .....	490
digital games .....	346
discrete-time Markov chain (DTMC) .....	381
dynamic difficulty adjustment .....	46, 261
edit games .....	102
educational games .....	324, 346, 354
empowerment .....	165
emulation .....	197
enemy .....	157
Ensemble Decision System (EDS) .....	197
ensemble methods .....	197, 385
evaluation .....	269
evolutionary methods .....	86, 102, 110, 221, 245, 277, 409, 417
exception-tolerant hierarchical knowledge bases (HKB) .....	425
exertion games .....	405
experimental design .....	324
expertise .....	117
explainable AI .....	458, 474
fighting game AI .....	46, 54, 433
FightingICE .....	433
first person shooter (FPS) .....	261, 389
flow .....	324
forward model approximation .....	425

framework .....	377
fuzzy controllers .....	269
game AI .....	133, 387, 417, 474
game analytics .....	117
game control .....	25
game design .....	458
game design assistant .....	466
game environment .....	149
game theory .....	181
game tree search .....	253
game usage data .....	213
game-playing agent analysis/metrics .....	1
gamification .....	370
gaze .....	125
general game playing (GGP) .....	78, 110, 490
general video game AI (GVGAI) .....	1, 62, 285, 315, 397, 425
genetic algorithms (GA) .....	189, 269, 417
genetic programming (GP) .....	237
graph grammars .....	86
Hanabi .....	409
Hearthstone .....	445
Heroes of Might and Magic .....	86
heuristic .....	445
heuristics design .....	94
history of mathematics .....	490
human computer interaction (HCI) .....	405, 458
human pose .....	405
human test .....	498
hybrid reward architecture .....	433
imitation learning .....	308
imperfect information .....	181
influence maps .....	133
information theory .....	165
intelligent feedback .....	339
interactive storytelling .....	332
internet-of-things (IoT) .....	354, 362, 370
intrinsic motivation .....	157, 165, 293
joint training .....	70
joints .....	405
Kingdomino .....	94
learner-game interaction .....	324
learning .....	117, 362

learning by observing .....	78
learning motivation .....	324
learning platform .....	149
learning process .....	346
level generation .....	277
ludemes .....	490
machine learning .....	391, 458
map generation .....	86
matchmaking .....	377
math functions .....	346
mathematical games .....	110
mathematical model .....	377
methodology .....	466
metrics .....	482
micro management .....	221
mixed-Initiative .....	205, 482
mixed-initiative co-creation .....	458
multi-player online battle arena (MOBA) .....	117
Monte Carlo methods .....	94
Monte Carlo tree search (MCTS) .....	33, 46, 54, 62, 141, 165, 197, 253, 301, 397, 425, 445, 490
Ms. Pac-Man .....	197
multi-agent search .....	173
multi-agent systems .....	25
multi-task learning .....	70
neural networks .....	70, 221, 445
non-dominated sorting genetic algorithm (NSGA-II) .....	133
non-player character (NPC) .....	157, 261, 393
novelty .....	482
online games .....	377, 385
online optimization .....	25
online parameter tuning .....	397
opponent exploitation .....	181
opponent modeling .....	181
optimization .....	269
options .....	229
Pac-Man .....	197
pathfinding .....	173, 394
performance .....	339
personas .....	54
phylogenetics .....	490
physically-based simulation .....	25
planar graph .....	189
Planet Wars .....	401
player modeling .....	141

player satisfaction .....	377
player commitment/engagement .....	213
player modelling .....	213
player usage metrics .....	213
playtesting .....	33
Poker .....	237
potential fields .....	133
pre-processing .....	213
probabilistic computation .....	94
procedural animation .....	125
procedural content generation (PCG) .....	17, 86, 101, 245, 277
procedural level generation .....	189
public goods game .....	41
puzzles .....	102
 Q-learning .....	9, 149
 random search .....	62
real-time strategy game (RTS) .....	149, 205, 221, 229, 301, 401, 437
real-time heuristic search .....	173, 394
recommender systems .....	385
regular language inference .....	78
regularization .....	70
reinforcement learning (RL) .....	229, 261, 285, 308, 391
repeated games .....	181
replays .....	498
revision .....	339
reward shaping .....	293
robustness .....	157
rolling horizon evolution .....	62, 401
RTS Micro .....	133
 scale-free networks .....	245
scenarios .....	354
sea water scenarios .....	354
search .....	453
search-based PCG .....	277
self-adaptive search .....	397
sensors .....	370
serious games .....	332, 362, 370
simplified boardgames .....	78
simulated car racing .....	269
simulation .....	197
skeleton tracking .....	405
skill acquisition .....	117
skill matching .....	261
skill rating .....	377
social dilemma .....	41

social interaction .....	125
sparse rewards .....	293
spectators .....	54
StarCraft .....	453, 498
StarCraft: Brood War .....	417
state evaluation .....	301
strategy games .....	86, 253
supervised machine learning .....	445
surrogate model .....	277
team of agents .....	466
The Open Racing Car Simulator (TORCS) .....	269
tree search .....	165
Unity .....	141
upper confidence bounds for trees (UCT) .....	165
user behavior .....	385
value network .....	70
video games .....	125, 269
video game streaming .....	54
virtual agents .....	332
virtual character .....	381
virtual human .....	125
visualizer .....	498
ViZDoom .....	389
wall building .....	453
win prediction .....	62
working memory .....	474