Kenji Doya

List of Publications by Citations

153 papers	10,384 citations	45 h-index	101 g-index
195 ext. papers	11,940 ext. citations	5.2 avg, IF	6.62 L-index

#	Paper	IF	Citations
153	A unifying computational framework for motor control and social interaction. *Philosophical Transactions of the Royal Society B: Biological Sciences*, **2003**, 358, 593-602	5.8	768
152	Representation of action-specific reward values in the striatum. *Science*, **2005**, 310, 1337-40	33.3	697
151	Prediction of immediate and future rewards differentially recruits cortico-basal ganglia loops. *Nature Neuroscience*, **2004**, 7, 887-93	25.5	683
150	Complementary roles of basal ganglia and cerebellum in learning and motor control. *Current Opinion in Neurobiology*, **2000**, 10, 732-9	7.6	631
149	Parallel neural networks for learning sequential procedures. *Trends in Neurosciences*, **1999**, 22, 464-71	13.3	605
148	Reinforcement learning in continuous time and space. *Neural Computation*, **2000**, 12, 219-45	2.9	529
147	Modulators of decision making. *Nature Neuroscience*, **2008**, 11, 410-6	25.5	469
146	Metalearning and neuromodulation. *Neural Networks*, **2002**, 15, 495-506	9.1	454
145	The computational neurobiology of learning and reward. *Current Opinion in Neurobiology*, **2006**, 16, 199-204	7.4	412
144	Multiple model-based reinforcement learning. *Neural Computation*, **2002**, 14, 1347-69	2.9	269
143	A neural correlate of reward-based behavioral learning in caudate nucleus: a functional magnetic resonance imaging study of a stochastic decision task. *Journal of Neuroscience*, **2004**, 24, 1660-5	6.6	230
142	Hierarchical Bayesian estimation for MEG inverse problem. *NeuroImage*, **2004**, 23, 806-26	7.9	200
141	Low-serotonin levels increase delayed reward discounting in humans. *Journal of Neuroscience*, **2008**, 28, 4528-32	6.6	192
140	Consensus Paper: Towards a Systems-Level View of Cerebellar Function: the Interplay Between Cerebellum, Basal Ganglia, and Cortex. *Cerebellum*, **2017**, 16, 203-229	4.3	187
139	Validation of decision-making models and analysis of decision variables in the rat basal ganglia. *Journal of Neuroscience*, **2009**, 29, 9861-74	6.6	167
138	Activation of dorsal raphe serotonin neurons underlies waiting for delayed rewards. *Journal of Neuroscience*, **2011**, 31, 469-79	6.6	165
137	Meta-learning in reinforcement learning. *Neural Networks*, **2003**, 16, 5-9	9.1	164

136	Optogenetic activation of dorsal raphe serotonin neurons enhances patience for future rewards. *Current Biology*, **2014**, 24, 2033-40	6.3	159
135	Parallel cortico-basal ganglia mechanisms for acquisition and execution of visuomotor sequences - a computational approach. *Journal of Cognitive Neuroscience*, **2001**, 13, 626-47	3.1	157
134	Serotonin differentially regulates short- and long-term prediction of rewards in the ventral and dorsal striatum. *PLoS ONE*, **2007**, 2, e1333	3.7	135
133	Acquisition of stand-up behavior by a real robot using hierarchical reinforcement learning. *Robotics and Autonomous Systems*, **2001**, 36, 37-51	3.5	133
132	Evidence for effector independent and dependent representations and their differential time course of acquisition during motor sequence learning. *Experimental Brain Research*, **2000**, 132, 149-62	2.3	127
131	Cerebellar aminergic neuromodulation: towards a functional understanding. *Brain Research Reviews*, **2004**, 44, 103-16		124
130	Electrophysiological properties of inferior olive neurons: A compartmental model. *Journal of Neurophysiology*, **1999**, 82, 804-17	3.2	109
129	The role of serotonin in the regulation of patience and impulsivity. *Molecular Neurobiology*, **2012**, 45, 213-24	6.2	103
128	Adaptive neural oscillator using continuous-time back-propagation learning. *Neural Networks*, **1989** , 2, 375-385	9.1	100
127	Unsupervised learning of granule cell sparse codes enhances cerebellar adaptive control. *Neuroscience*, **2001**, 103, 35-50	3.9	96
126	Chaos may enhance information transmission in the inferior olive. *Proceedings of the National Academy of Sciences of the United States of America*, **2004**, 101, 4655-60	11.5	93
125	fMRI investigation of cortical and subcortical networks in the learning of abstract and effector-specific representations of motor sequences. *NeuroImage*, **2006**, 32, 714-27	7.9	84
124	Reinforcement learning: Computational theory and biological mechanisms. *HFSP Journal*, **2007**, 1, 30-40		82
123	Multiple representations and algorithms for reinforcement learning in the cortico-basal ganglia circuit. *Current Opinion in Neurobiology*, **2011**, 21, 368-73	7.6	81
122	Multiple representations of belief states and action values in corticobasal ganglia loops. *Annals of the New York Academy of Sciences*, **2007**, 1104, 213-28	6.5	71
121	Activation of dorsal raphe serotonin neurons is necessary for waiting for delayed rewards. *Journal of Neuroscience*, **2012**, 32, 10451-7	6.6	70
120	Understanding neural coding through the model-based analysis of decision making. *Journal of Neuroscience*, **2007**, 27, 8178-80	6.6	69
119	A kinetic model of dopamine- and calcium-dependent striatal synaptic plasticity. *PLoS Computational Biology*, **2010**, 6, e1000670	5	68

118	Neuroethics Questions to Guide Ethical Research in the International Brain Initiatives. *Neuron*, **2018**, 100, 19-36	13.9	67
117	Learning CPG-based biped locomotion with a policy gradient method. *Robotics and Autonomous Systems*, **2006**, 54, 911-920	3.5	66
116	Humans can adopt optimal discounting strategy under real-time constraints. *PLoS Computational Biology*, **2006**, 2, e152	5	61
115	Robust reinforcement learning. *Neural Computation*, **2005**, 17, 335-59	2.9	59
114	Prediction of clinical depression scores and detection of changes in whole-brain using resting-state functional MRI data with partial least squares regression. *PLoS ONE*, **2017**, 12, e0179638	3.7	55
113	Distinct neural representation in the dorsolateral, dorsomedial, and ventral parts of the striatum during fixed- and free-choice tasks. *Journal of Neuroscience*, **2015**, 35, 3499-514	6.6	54
112	Brain mechanism of reward prediction under predictable and unpredictable environmental dynamics. *Neural Networks*, **2006**, 19, 1233-41	9.1	54
111	Identification of depression subtypes and relevant brain regions using a data-driven approach. *Scientific Reports*, **2018**, 8, 14082	4.9	54
110	Neural substrate of dynamic Bayesian inference in the cerebral cortex. *Nature Neuroscience*, **2016**, 19, 1682-1689	25.5	46
109	Activation of the central serotonergic system in response to delayed but not omitted rewards. *European Journal of Neuroscience*, **2011**, 33, 153-60	3.5	45
108	The Cyber Rodent Project: Exploration of Adaptive Mechanisms for Self-Preservation and Self-Reproduction. *Adaptive Behavior*, **2005**, 13, 149-160	1.1	45
107	Serotonin affects association of aversive outcomes to past actions. *Journal of Neuroscience*, **2009**, 29, 15669-74	6.6	43
106	Reinforcement learning: Computational theory and biological mechanisms **2007**, 1, 30-40		42
105	Serotonin and the evaluation of future rewards: theory, experiments, and possible neural mechanisms. *Annals of the New York Academy of Sciences*, **2007**, 1104, 289-300	6.5	40
104	Inter-module credit assignment in modular reinforcement learning. *Neural Networks*, **2003**, 16, 985-94	9.1	40
103	Toward Probabilistic Diagnosis and Understanding of Depression Based on Functional MRI Data Analysis with Logistic Group LASSO. *PLoS ONE*, **2015**, 10, e0123524	3.7	35
102	Hierarchical control of goal-directed action in the cortical–basal ganglia network. *Current Opinion in Behavioral Sciences*, **2015**, 5, 1-7	4	34
101	Reinforcement learning with via-point representation. *Neural Networks*, **2004**, 17, 299-305	9.1	30

100	Reward probability and timing uncertainty alter the effect of dorsal raphe serotonin neurons on patience. *Nature Communications*, **2018**, 9, 2048	17.4	30
99	Computational Model of Recurrent Subthalamo-Pallidal Circuit for Generation of Parkinsonian Oscillations. *Frontiers in Neuroanatomy*, **2017**, 11, 21	3.6	29
98	Nitric oxide regulates input specificity of long-term depression and context dependence of cerebellar learning. *PLoS Computational Biology*, **2007**, 3, e179	5	28
97	Evolutionary Development of Hierarchical Learning Structures. *IEEE Transactions on Evolutionary Computation*, **2007**, 11, 249-264	15.6	28
96	Reward-Predictive Neural Activities in Striatal Striosome Compartments. *ENeuro*, **2018**, 5,	3.9	28
95	Evidence for model-based action planning in a sequential finger movement task. *Journal of Motor Behavior*, **2010**, 42, 371-9	1.4	27
94	Model-based action planning involves cortico-cerebellar and basal ganglia networks. *Scientific Reports*, **2016**, 6, 31378	4.9	25
93	Three-dimensional distribution of Fos-positive neurons in the supramammillary nucleus of the rat exposed to novel environment. *Neuroscience Research*, **2009**, 64, 397-402	2.9	25
92	Changing the structure of complex visuo-motor sequences selectively activates the fronto-parietal network. *NeuroImage*, **2012**, 59, 1180-9	7.9	24
91	Near-saddle-node bifurcation behavior as dynamics in working memory for goal-directed behavior. *Neural Computation*, **1998**, 10, 113-32	2.9	23
90	Anterior and superior lateral occipito-temporal cortex responsible for target motion prediction during overt and covert visual pursuit. *Neuroscience Research*, **2006**, 54, 112-23	2.9	22
89	Adaptive Baseline Enhances EM-Based Policy Search: Validation in a View-Based Positioning Task of a Smartphone Balancer. *Frontiers in Neurorobotics*, **2017**, 11, 1	3.4	21
88	Inter-individual discount factor differences in reward prediction are topographically associated with caudate activation. *Experimental Brain Research*, **2011**, 212, 593-601	2.3	21
87	Prediction of Immediate and Future Rewards Differentially Recruits Cortico-Basal Ganglia Loops **2016**, 593-616		19
86	Statistical characteristics of climbing fiber spikes necessary for efficient cerebellar learning. *Biological Cybernetics*, **2001**, 84, 183-92	2.8	16
85	Evolution of recurrent neural controllers using an extended parallel genetic algorithm. *Robotics and Autonomous Systems*, **2005**, 52, 148-159	3.5	15
84	MOSAIC for multiple-reward environments. *Neural Computation*, **2012**, 24, 577-606	2.9	14
83	From free energy to expected energy: Improving energy-based value function approximation in reinforcement learning. *Neural Networks*, **2016**, 84, 17-27	9.1	13

82	Constrained reinforcement learning from intrinsic and extrinsic rewards **2007**,		13
81	Finding intrinsic rewards by embodied evolution and constrained reinforcement learning. *Neural Networks*, **2008**, 21, 1447-55	9.1	13
80	Uncertainty in action-value estimation affects both action choice and learning rate of the choice behaviors of rats. *European Journal of Neuroscience*, **2012**, 35, 1180-9	3.5	12
79	Multiple model-based reinforcement learning explains dopamine neuronal activity. *Neural Networks*, **2007**, 20, 668-75	9.1	12
78	Evaluation of linearly solvable Markov decision process with dynamic model learning in a mobile robot navigation task. *Frontiers in Neurorobotics*, **2013**, 7, 7	3.4	11
77	A hierarchical Bayesian method to resolve an inverse problem of MEG contaminated with eye movement artifacts. *NeuroImage*, **2009**, 45, 393-409	7.9	11
76	Co-evolution of Shaping Rewards and Meta-Parameters in Reinforcement Learning. *Adaptive Behavior*, **2008**, 16, 400-412	1.1	11
75	Evolution of Neural Architecture Fitting Environmental Dynamics. *Adaptive Behavior*, **2005**, 13, 53-66	1.1	11
74	Neural and personality correlates of individual differences related to the effects of acute tryptophan depletion on future reward evaluation. *Neuropsychobiology*, **2012**, 65, 55-64	4	10
73	A model-based prediction of the calcium responses in the striatal synaptic spines depending on the timing of cortical and dopaminergic inputs and post-synaptic spikes. *Frontiers in Computational Neuroscience*, **2013**, 7, 119	3.5	10
72	Switching particle filters for efficient visual tracking. *Robotics and Autonomous Systems*, **2006**, 54, 873-884	3.5	10
71	Dimension Reduction of Biological Neuron Models by Artificial Neural Networks. *Neural Computation*, **1994**, 6, 696-717	2.9	10
70	How can we learn efficiently to act optimally and flexibly?. *Proceedings of the National Academy of Sciences of the United States of America*, **2009**, 106, 11429-30	11.5	9
69	Hierarchical reinforcement learning for motion learning: learning 'stand-up' trajectories. *Advanced Robotics*, **1998**, 13, 267-268	1.7	9
68	A spiking neural network model of model-free reinforcement learning with high-dimensional sensory input and perceptual ambiguity. *PLoS ONE*, **2015**, 10, e0115620	3.7	9
67	Multiple co-clustering based on nonparametric mixture models with heterogeneous marginal distributions. *PLoS ONE*, **2017**, 12, e0186566	3.7	9
66	Serotonergic projections to the orbitofrontal and medial prefrontal cortices differentially modulate waiting for future rewards. *Science Advances*, **2020**, 6,	14.3	9
65	Parallel Representation of Value-Based and Finite State-Based Strategies in the Ventral and Dorsal Striatum. *PLoS Computational Biology*, **2015**, 11, e1004540	5	8

64	Combining learned controllers to achieve new goals based on linearly solvable MDPs **2014**,		8
63	The mechanism of saccade motor pattern generation investigated by a large-scale spiking neuron model of the superior colliculus. *PLoS ONE*, **2013**, 8, e57134	3.7	8
62	MOSAIC Reinforcement Learning Architecture: Symbolization by Predictability and Mimic Learning by Symbol. *Journal of the Robotics Society of Japan*, **2001**, 19, 551-556	0.1	8
61	Exciting Time for Neural Networks. *Neural Networks*, **2015**, 61, xv-xvi	9.1	7
60	A computational neural model of goal-directed utterance selection. *Neural Networks*, **2010**, 23, 592-606	9.1	7
59	Learning how, what, and whether to communicate: emergence of protocommunication in reinforcement learning agents. *Artificial Life and Robotics*, **2008**, 12, 70-74	0.6	7
58	Acquisition of Stand-up Behavior by a 3-link 2-joint Robot using Hierarchical Reinforcement Learning. *Journal of the Robotics Society of Japan*, **2001**, 19, 574-579	0.1	6
57	Self-organization of action hierarchy and compositionality by reinforcement learning with recurrent neural networks. *Neural Networks*, **2020**, 129, 149-162	9.1	5
56	Reinforcement learning with state-dependent discount factor **2013**,		5
55	Emergence of polymorphic mating strategies in robot colonies. *PLoS ONE*, **2014**, 9, e93622	3.7	5
54	Inverse reinforcement learning using Dynamic Policy Programming **2014**,		5
53	Symbolization and imitation learning of motion sequence using competitive modules. *Electronics and Communications in Japan, Part III: Fundamental Electronic Science (English Translation of Denshi Tsushin Gakkai Ronbunshi)*, **2006**, 89, 42-53		5
52	Reinforcement learning state estimator. *Neural Computation*, **2007**, 19, 730-56	2.9	5
51	Scaled free-energy based reinforcement learning for robust and efficient learning in high-dimensional state spaces. *Frontiers in Neurorobotics*, **2013**, 7, 3	3.4	5
50	Hierarchical Reinforcement Learning for Multiple Reward Functions. *Journal of the Robotics Society of Japan*, **2004**, 22, 120-129	0.1	5
49	The Basal Ganglia and the Encoding of Value **2009**, 407-416		5
48	A biologically constrained spiking neural network model of the primate basal ganglia with overlapping pathways exhibits action selection. *European Journal of Neuroscience*, **2021**, 53, 2254-2277	3.5	5
47	A whole brain probabilistic generative model: Toward realizing cognitive architectures for developmental robots.. *Neural Networks*, **2022**, 150, 293-312	9.1	5

46	Faster Turnaround. *Neural Networks*, **2014**, 49, xiv-xv	9.1	4
45	Expedited review process. *Neural Networks*, **2012**, 25, 1	9.1	4
44	Condition interference in rats performing a choice task with switched variable- and fixed-reward conditions. *Frontiers in Neuroscience*, **2015**, 9, 27	5.1	4
43	Derivatives of logarithmic stationary distributions for policy gradient reinforcement learning. *Neural Computation*, **2010**, 22, 342-76	2.9	4
42	Combining modalities with different latencies for optimal motor control. *Journal of Cognitive Neuroscience*, **2008**, 20, 1966-79	3.1	4
41	Serotonergic modulation of cognitive computations. *Current Opinion in Behavioral Sciences*, **2021**, 38, 116-123	4	4
40	Online meta-learning by parallel algorithm competition **2018**,		4
39	Toward evolutionary and developmental intelligence. *Current Opinion in Behavioral Sciences*, **2019**, 29, 91-96	4	3
38	Robustness of linearly solvable Markov games employing inaccurate dynamics model. *Artificial Life and Robotics*, **2018**, 23, 1-9	0.6	3
37	APPLICATION OF EVOLUTIONARY COMPUTATION FOR EFFICIENT REINFORCEMENT LEARNING. *Applied Artificial Intelligence*, **2006**, 20, 35-55	2.3	3
36	Free-Energy Based Reinforcement Learning for Vision-Based Navigation with High-Dimensional Sensory Inputs. *Lecture Notes in Computer Science*, **2010**, 215-222	0.9	3
35	Diffusion functional MRI reveals global brain network functional abnormalities driven by targeted local activity in a neuropsychiatric disease mouse model. *NeuroImage*, **2020**, 223, 117318	7.9	3
34	Forward and inverse reinforcement learning sharing network weights and hyperparameters. *Neural Networks*, **2021**, 144, 138-153	9.1	3
33	EM-based policy hyper parameter exploration: application to standing and balancing of a two-wheeled smartphone robot. *Artificial Life and Robotics*, **2016**, 21, 125-131	0.6	2
32	State of Neural Networks Is Strong. *Neural Networks*, **2016**, 73, xiii	9.1	2
31	Natural actor-critic with baseline adjustment for variance reduction. *Artificial Life and Robotics*, **2008**, 13, 275-279	0.6	2
30	Humans can adopt optimal discounting strategy under real-time constraints. *PLoS Computational Biology*, **2005**, preprint, e152	5	2
29	Chunking Phenomenon in Complex Sequential Skill Learning in Humans. *Lecture Notes in Computer Science*, **2004**, 294-299	0.9	2

28	A New Natural Policy Gradient by Stationary Distribution Metric. *Lecture Notes in Computer Science*, **2008**, 82-97	0.9	2
27	Co-evolution of Rewards and Meta-parameters in Embodied Evolution. *Lecture Notes in Computer Science*, **2009**, 278-302	0.9	2
26	Canonical cortical circuits and the duality of Bayesian inference and optimal control. *Current Opinion in Behavioral Sciences*, **2021**, 41, 160-166	4	2
25	Promoting Further Developments of Neural Networks. *Neural Networks*, **2017**, 85, xiii	9.1	1
24	Fostering deep learning and beyond. *Neural Networks*, **2018**, 97, iii-iv	9.1	1
23	The Basal Ganglia, Reinforcement Learning, and the Encoding of Value **2014**, 321-333		1
22	Inter Subject Correlation of Brain Activity during Visuo-Motor Sequence Learning. *Lecture Notes in Computer Science*, **2014**, 35-41	0.9	1
21	Multiple model-based reinforcement learning for nonlinear control. *Electronics and Communications in Japan, Part III: Fundamental Electronic Science (English Translation of Denshi Tsushin Gakkai Ronbunshi)*, **2006**, 89, 54-69		1
20	Driver model based on reinforced learning with multiple-step state estimation. *Electronics and Communications in Japan, Part III: Fundamental Electronic Science (English Translation of Denshi Tsushin Gakkai Ronbunshi)*, **2003**, 86, 85-95		1
19	Neural network model of temporal pattern memory. *Systems and Computers in Japan*, **1991**, 22, 61-69		1
18	Estimating Internal Variables of a Decision Maker□s Brain: A Model-Based Approach for Neuroscience. *Lecture Notes in Computer Science*, **2007**, 596-603	0.9	1
17	Cognitive Robotics. Robotics and the brain sciences.. *Journal of the Robotics Society of Japan*, **1999**, 17, 7-10	0.1	1
16	NeuroEvolution Based on Reusable and Hierarchical Modular Representation. *Lecture Notes in Computer Science*, **2009**, 22-31	0.9	1
15	Average Reward Optimization with Multiple Discounting Reinforcement Learners. *Lecture Notes in Computer Science*, **2017**, 789-800	0.9	0
14	Social impact and governance of AI and neurotechnologies. *Neural Networks*, **2022**, 152, 542-554	9.1	0
13	Chunking During Learning of Visuomotor Sequences with Spatial and Arbitrary Rules: Preliminary Findings. *Psychological Studies*, **2012**, 57, 22-28	1	
12	Evolution of rewards and learning mechanisms in Cyber Rodents109-128		
11	Learning a dynamic policy by using policy gradient: application to biped walking. *Systems and Computers in Japan*, **2007**, 38, 25-38		

10	S3f2-5 Learning model-based analysis of neuroimaging data(S3-f2: "Advances in Anatomical, Functional, and Computational Brain Imaging",Symposia,Abstract,Meeting Program of EABS & BSJ 2006). *Seibutsu Butsuri*, **2006**, 46, S146	0
9	Inter-module credit assignment in modular reinforcement learning. *Neural Networks*, **2003**, 16, 985-985	9.1
8	Special issue on Symbol Emergence in Robotics and Cognitive Systems (I). *Advanced Robotics*, **2022**, 36, 1-2	1.7
7	Finding Exploratory Rewards by Embodied Evolution and Constrained Reinforcement Learning in the Cyber Rodents. *Lecture Notes in Computer Science*, **2007**, 167-176	0.9
6	??????????????. *The Brain & Neural Networks*, **2007**, 14, 293-304	0.1
5	Information Coded in the Striatum During Decision-Making. *Advances in Cognitive Neurodynamics*, **2018**, 19-25	
4	An Experimental Study of Emergence of Communication of Reinforcement Learning Agents. *Lecture Notes in Computer Science*, **2019**, 91-100	0.9
3	Emergence of Different Mating Strategies in Artificial Embodied Evolution. *Lecture Notes in Computer Science*, **2009**, 638-647	0.9
2	Calcium Responses Model in Striatum Dependent on Timed Input Sources. *Lecture Notes in Computer Science*, **2009**, 249-258	0.9
1	Special issue on symbol emergence in robotics and cognitive systems (II). *Advanced Robotics*, **2022**, 36, 217-218	1.7