

# Publications List

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## REFERENCES

- [1] G. Agre, P. Kormushev, and I. Dilov, "Infrawebs axiom editor - a graphical ontology-driven tool for creating complex logical expressions," *International Journal of Information Theories and Applications*, vol. 13, no. 2, pp. 169–178, November 2006.
- [2] G. Agre, P. Kormushev, and I. Dilov, *INFRAWEBs Axiom Editor User's Guide*, 2006.
- [3] G. Agre, P. Kormushev, and I. Dilov, "Infrawebs capability editor - a graphical ontology-driven tool for creating capabilities of semantic web services," in *Third International Conference on Information Research, Applications and Education i.TECH-2005*, June 2005, p. 228.
- [4] S. R. Ahmadzadeh, M. Leonetti, and P. Kormushev, "Online direct policy search for thruster failure recovery in autonomous underwater vehicles," in *6th International workshop on Evolutionary and Reinforcement Learning for Autonomous Robot System (ERLARS 2013), in conjunction with the 12th European Conference on Artificial Life (ECAL 2013)*, Taormina, Italy, September 2013.
- [5] S. R. Ahmadzadeh, R. S. Jamisola, P. Kormushev, and D. G. Caldwell, "Learning reactive robot behavior for autonomous valve turning," in *Proc. IEEE Intl Conf. on Humanoid Robots (Humanoids 2014)*, Madrid, Spain, November 2014.
- [6] S. R. Ahmadzadeh, P. Kormushev, and D. G. Caldwell, "Interactive robot learning of visuospatial skills," in *Proc. IEEE Intl Conf. on Advanced Robotics (ICAR 2013)*, Montevideo, Uruguay, November 2013.
- [7] S. R. Ahmadzadeh, P. Kormushev, and D. G. Caldwell, "Autonomous robotic valve turning: A hierarchical learning approach," in *Robotics and Automation (ICRA), 2013 IEEE International Conference on*, 2013, pp. 4614–4619.
- [8] S. R. Ahmadzadeh, A. Carrera, M. Leonetti, P. Kormushev, and D. G. Caldwell, "Online discovery of auv control policies to overcome thruster failures," in *Proc. IEEE Intl Conf. on Robotics and Automation (ICRA 2014)*, Hong Kong, China, June 2014.
- [9] S. R. Ahmadzadeh, P. Kormushev, and D. G. Caldwell, "Visuospatial skill learning for object reconfiguration tasks," in *Proc. IEEE/RSJ Intl Conf. on Intelligent Robots and Systems (IROS 2013)*, Tokyo, Japan, November 2013.
- [10] S. R. Ahmadzadeh, P. Kormushev, and D. G. Caldwell, "Multi-objective reinforcement learning for auv thruster failure recovery," in *Proc. IEEE Symposium Series on Computational Intelligence (SSCI 2014)*, Florida, USA, December 2014.
- [11] S. Calinon, P. Kormushev, and D. G. Caldwell, "Compliant skills acquisition and multi-optima policy search with em-based reinforcement learning," *Robotics and Autonomous Systems*, 2012.
- [12] A. Carrera, N. Palomeras, N. Hurtos, P. Kormushev, and M. Carreras, "Learning by demonstration applied to underwater intervention," in *Proc. International Conference of the Catalan Association for Artificial Intelligence*, 2014.
- [13] A. Carrera, S. R. Ahmadzadeh, A. Ajoudani, P. Kormushev, M. Carreras, and D. G. Caldwell, "Towards autonomous robotic valve turning," *Cybernetics and Information Technologies*, vol. 12, no. 3, pp. 17–26, 2012.
- [14] A. Carrera, M. Carreras, P. Kormushev, N. Palomeras, and S. Nagappa, "Towards valve turning with an AUV using Learning by Demonstration," in *Proc. MTS/IEEE OCEANS 2013 - Bergen: The Challenges of the Northern Dimension*, Bergen, Norway, June 2013.
- [15] A. Carrera, N. Palomeras, D. Ribas, P. Kormushev, and M. Carreras, "An Intervention-AUV learns how to perform an underwater valve turning," in *Proc. MTS/IEEE OCEANS 2014 - Taipei*, Taipei, Taiwan, April 2014.
- [16] L. Colasanto, P. Kormushev, N. Tsagarakis, and D. G. Caldwell, "Optimization of a compact model for the compliant humanoid robot coman using reinforcement learning," *International Journal of Cybernetics and Information Technologies*, vol. 12, no. 3, 2012.
- [17] H. Dallali, P. Kormushev, Z. Li, and D. G. Caldwell, "On global optimization of walking gaits for the compliant humanoid robot coman using reinforcement learning," *International Journal of Cybernetics and Information Technologies*, vol. 12, no. 3, 2012.
- [18] H. Dallali, P. Kormushev, N. Tsagarakis, and D. G. Caldwell, "Can active impedance protect robots from landing impact?" in *Proc. IEEE Intl Conf. on Humanoid Robots (Humanoids 2014)*, Madrid, Spain, November 2014.
- [19] H. Dallali, M. Mosadeghzad, G. A. Medrano-Cerda, N. Docquier, P. Kormushev, N. Tsagarakis, Z. Li, and D. Caldwell, "Development of a dynamic simulator for a compliant humanoid robot based on a symbolic multibody approach," in *Mechatronics (ICM), 2013 IEEE International Conference on*, 2013, pp. 598–603.
- [20] N. Jamali, P. Kormushev, and D. G. Caldwell, "Robot-object contact perception using symbolic temporal pattern learning," in *Proc. IEEE Intl Conf. on Robotics and Automation (ICRA 2014)*, Hong Kong, China, June 2014.
- [21] N. Jamali, P. Kormushev, and D. G. Caldwell, "Contact state estimation using machine learning," in *Proc. MTS/IEEE Intl Conf. OCEANS 2013*, San Diego, USA, September 2013.
- [22] N. Jamali, P. Kormushev, S. R. Ahmadzadeh, and D. G. Caldwell, "Covariance analysis as a measure of policy robustness in reinforcement learning," in *Proc. MTS/IEEE Intl Conf. OCEANS 2014*, Taipei, Taiwan, April 2014.
- [23] R. S. Jamisola, P. Kormushev, A. Bicchi, and D. G. Caldwell, "Haptic exploration of unknown surfaces with discontinuities," in *Proc. IEEE/RSJ Intl Conf. on Intelligent Robots and Systems (IROS 2014)*, Chicago, USA, September 2014.
- [24] G. C. Karras, C. P. Bechlioulis, M. Leonetti, N. Palomeras, P. Kormushev, K. J. Kyriakopoulos, and D. G. Caldwell, "On-line identification of autonomous underwater vehicles through global derivative-free optimization," in *Proc. IEEE/RSJ Intl Conf. on Intelligent Robots and Systems (IROS 2013)*, Tokyo, Japan, November 2013.
- [25] P. Kormushev, S. Calinon, and D. G. Caldwell, "Robot motor skill coordination with EM-based reinforcement learning," in *Proc. IEEE/RSJ Intl Conf. on Intelligent Robots and Systems (IROS)*, Taipei, Taiwan, October 2010, pp. 3232–3237.
- [26] P. Kormushev, B. Ugurlu, S. Calinon, N. Tsagarakis, and D. G. Caldwell, "Bipedal walking energy minimization by reinforcement learning with evolving policy parameterization," in *Proc. IEEE/RSJ Intl Conf. on Intelligent Robots and Systems (IROS)*, San Francisco, USA, September 2011, pp. 318–324.
- [27] P. Kormushev, S. Calinon, and D. G. Caldwell, "Imitation learning of

- positional and force skills demonstrated via kinesthetic teaching and haptic input,” *Advanced Robotics*, vol. 25, no. 5, pp. 581–603, 2011.
- [28] P. Kormushev, K. Nomoto, F. Dong, and K. Hirota, “Time manipulation technique for speeding up reinforcement learning in simulations,” *International Journal of Cybernetics and Information Technologies*, vol. 8, No. 1, pp. 12–24, 2008.
- [29] P. Kormushev, K. Nomoto, F. Dong, and K. Hirota, “Time hopping technique for faster reinforcement learning in simulations,” *International Journal of Cybernetics and Information Technologies*, vol. 11, no. 3, pp. 42–59, 2011.
- [30] P. Kormushev and D. G. Caldwell, “Comparative evaluation of reinforcement learning with scalar rewards and linear regression with multidimensional feedback,” in *ECML/PKDD 2013 Workshop on Reinforcement Learning from Generalized Feedback: Beyond numeric rewards*, Prague, Czech Republic, September 2013.
- [31] P. Kormushev and D. G. Caldwell, “Direct policy search reinforcement learning based on particle filtering,” in *The 10th European Workshop on Reinforcement Learning (EWRL 2012), part of the Intl Conf. on Machine Learning (ICML 2012)*, Edinburgh, UK, June 2012.
- [32] P. Kormushev and D. G. Caldwell, “Reinforcement learning with heterogeneous policy representations,” in *The 11th European Workshop on Reinforcement Learning (EWRL 2013) held as a Dagstuhl Seminar*, Dagstuhl, Germany, August 2013.
- [33] P. Kormushev, S. Calinon, R. Saegusa, and G. Metta, “Learning the skill of archery by a humanoid robot iCub,” in *Proc. IEEE Intl Conf. on Humanoid Robots (Humanoids)*, Nashville, USA, December 2010, pp. 417–423.
- [34] P. Kormushev, S. Calinon, and D. G. Caldwell, “Approaches for learning human-like motor skills which require variable stiffness during execution,” in *IEEE Intl Conf. on Humanoid Robots (Humanoids), Workshop on Humanoid Robots Learning from Human Interaction*, Nashville, USA, December 2010.
- [35] P. Kormushev, D. N. Nenchev, S. Calinon, and D. G. Caldwell, “Upper-body kinesthetic teaching of a free-standing humanoid robot,” in *Proc. IEEE Intl Conf. on Robotics and Automation (ICRA)*, Shanghai, China, 2011, pp. 3970–3975.
- [36] P. Kormushev, S. Calinon, D. G. Caldwell, and B. Ugurlu, “Challenges for the policy representation when applying reinforcement learning in robotics,” in *Neural Networks (IJCNN), The 2012 International Joint Conference on*. IEEE, 2012, pp. 1–8.
- [37] P. Kormushev, B. Ugurlu, L. Colasanto, N. G. Tsagarakis, and D. G. Caldwell, “The anatomy of a fall: Automated real-time analysis of raw force sensor data from bipedal walking robots and humans,” in *Intelligent Robots and Systems (IROS), 2012 IEEE/RSJ International Conference on*. IEEE, 2012, pp. 3706–3713.
- [38] P. Kormushev and D. G. Caldwell, “Improving the energy efficiency of autonomous underwater vehicles by learning to model disturbances,” in *Proc. IEEE/RSJ Intl Conf. on Intelligent Robots and Systems (IROS)*, Tokyo, Japan, November 2013.
- [39] P. Kormushev and D. G. Caldwell, “Simultaneous discovery of multiple alternative optimal policies by reinforcement learning,” in *Intelligent Systems (IS), 2012 6th IEEE International Conference*. IEEE, 2012, pp. 202–207.
- [40] P. Kormushev, F. Dong, and K. Hirota, “Probability redistribution using time hopping for reinforcement learning,” in *Proc. 10th International Symposium on Advanced Intelligent Systems, ISIS 2009*, Busan, Korea, 2009.
- [41] P. Kormushev, K. Nomoto, F. Dong, and K. Hirota, “Eligibility propagation to speed up time hopping for reinforcement learning,” *Journal of Advanced Computational Intelligence and Intelligent Informatics*, vol. 13, No. 6, 2009.
- [42] P. Kormushev, S. Calinon, and D. G. Caldwell, “Reinforcement learning in robotics: Applications and real-world challenges,” *Robotics*, vol. 2, no. 3, pp. 122–148, 2013.
- [43] P. Kormushev, “Design, development and implementation of a tool for construction of declarative functional descriptions of semantic web services based on wsmo methodology,” Master’s thesis, Faculty of Mathematics and Informatics, Sofia University, July 2005.
- [44] P. Kormushev, “Visual approach for data mining on medical information databases using fastmap algorithm,” Master’s thesis, Faculty of Mathematics and Informatics, Sofia University, March 2006.
- [45] P. Kormushev and D. G. Caldwell, “Towards improved auv control through learning of periodic signals,” in *Proc. MTS/IEEE Intl Conf. OCEANS 2013*, San Diego, USA, September 2013.
- [46] P. Kormushev, “Time hopping technique for reinforcement learning and its application to robot control,” Ph.D. dissertation, Tokyo Institute of Technology (TiTech), Japan, 2009.
- [47] F. Sato, T. Nishii, J. Takahashi, Y. Yoshida, M. Mitsuhashi, P. Kormushev, and Y. Kanamiya, “Whiteboard cleaning task realization with hoap-2,” in *Proc. SICE System Integration (SI-2010)*, Sendai, Japan, 2010, pp. 426–429.
- [48] P. Kryczka, K. Hashimoto, A. Takanishi, P. Kormushev, N. Tsagarakis, and D. G. Caldwell, “Walking despite the passive compliance: Techniques for using conventional pattern generators to control intrinsically compliant humanoid robots,” in *Proc. Intl Conf. on Climbing and Walking Robots CLAWAR 2013*, Sydney, Australia, July 2013.
- [49] P. Kryczka, Y. M. Shigematsu, P. Kormushev, K. Hashimoto, H.-o. Lim, and A. Takanishi, “Towards dynamically consistent real-time gait pattern generation for full-size humanoid robots,” in *ROBIO 2013*, 2013.
- [50] P. Kryczka, P. Kormushev, K. Hashimoto, H.-o. Lim, N. G. Tsagarakis, D. G. Caldwell, and A. Takanishi, “Hybrid gait pattern generator capable of rapid and dynamically consistent pattern regeneration,” in *URAI 2013*. IEEE, 2013, pp. 475–480.
- [51] D. M. Lane, F. Maurelli, P. Kormushev, M. Carreras, M. Fox, and K. Kyriakopoulos, “Persistent autonomy: the challenges of the PANDORA project,” *Proceedings of IFAC Manoeuvring and Control of Marine Craft MCMC 2012*, 2012.
- [52] M. Leonetti, P. Kormushev, and S. Sagratella, “Combining local and global direct derivative-free optimization for reinforcement learning,” *International Journal of Cybernetics and Information Technologies*, vol. 12, no. 3, 2012.
- [53] M. Leonetti, S. R. Ahmadzadeh, and P. Kormushev, “On-line learning to recover from thruster failures on autonomous underwater vehicles,” in *Proc. MTS/IEEE Intl Conf. OCEANS 2013*, San Diego, USA, September 2013.
- [54] H. Shen, J. Yosinski, P. Kormushev, D. Caldwell, and H. Lipson, “Learning fast quadruped robot gaits with the rl power spline parameterization,” *International Journal of Cybernetics and Information Technologies*, vol. 12, no. 3, 2012.
- [55] Y. Yamazaki, F. Dong, Y. Masuda, Y. Uehara, P. Kormushev, H. A. Vu, P. Q. Le, and K. Hirota, “Fuzzy inference based mentality estimation for eye robot agent,” in *Proc. 23rd Fuzzy System Symposium FSS-2007*, 2007.
- [56] Y. Yamazaki, F. Dong, Y. Masuda, Y. Uehara, P. Kormushev, H. A. Vu, P. Q. Le, and K. Hirota, “Intent expression using eye robot for mascot robot system,” in *8th International Symposium on Advanced Intelligent Systems (ISIS-2007)*, 2007.