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## **Spiking Reasoning System**

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## Abstract

© 2017 IEEE. In this position paper the newel approach for the spiking reasoning system for the real-time processing of a robotic system represented. This is the development of the 'Robot dream' architecture presented earlier, specifically the real-time robotic management system. The main idea of the architecture is inherited from our previous works on machine cognition that have their roots in works of Marvin Minsky, specifically 'model of six' as six levels of the mental activity. The principal approach for the high-level architecture and provide examples of the data structures of the spiking reasoning system and robotic system management architecture was demonstrated.

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## Keywords

ai, cognition, human, robot

## References

- [1] A. V. Samsonovich, "Modeling human emotional intelligence in virtual agents," in AAAI Fall Symposium-Technical Report, vol. FS-13-03. AI Access Foundation, 2013, pp. 71-78. [Online]. Available: Http://www. scopus.com/inward/record.url?eid=2-s2.0-84898885813&partnerID=tZOtx3y1
- [2] S. Franklin, T. Madl, S. K. D'Mello, and J. Snaider, "LIDA: A systems-level architecture for cognition, emotion, and learning, " IEEE Trans. Autonomous Mental Development, vol. 6, no. 1, pp. 19-41, 2014. [Online]. Available: Http: //dx. doi. org/10. 1109/TAMD. 2013. 2277589
- [3] P. O. A. Haikonen, "CONSCIOUSNESS AND SENTIENT ROBOTS," International Journal of Machine Consciousness, vol. 05, no. 01, pp. 11-26, Jun. 2013. [Online]. Available: Http://www.worldscientific.com/doi/abs/10. 1142/S1793843013400027
- [4] P. Wang, Non-Axiomatic Logic: A Model of Intelligent Reasoning. World Scientific, 2013.
- [5] S. Marsella, J. Gratch, and P. Petta, "Computational models of emotion," in A blueprint for a affective computing: A sourcebook and manual., K. Scherer, T. Bänziger, and E. Roesch, Eds. Oxford: Oxford University Press, 2010.
- [6] M. Sokolov, R. Lavrenov, A. Gabdullin, I. Afanasyev, and E. Magid, "3d modelling and simulation of a crawler robot in ros/gazebo," in Int. Conf. on Control, Mechatronics and Automation, 2016, pp. 61-65.
- [7] R. Khusainov, I. Afanasyev, L. Sabirova, and E. Magid, "Bipedal robot locomotion modelling with virtual height inverted pendulum and preview control approaches in simulink environment, " J. of Robotics, Networking and artificial Life, vol. 3 (3), pp. 182-187, 2016.
- [8] L. Lanari, S. Hutchinson, and L. Marchionni, "Boundedness issues in planning of locomotion trajectories for biped robots," in IEEE-RAS Int. Conf. on Humanoid Robots, 2014, pp. 951-958.
- [9] N. Kofinas, E. Orfanoudakis, and M. Lagoudakis, "Complete analytical forward and inverse kinematics for the nao humanoid robot, " J. of Intelligent and Robotics systems, vol. 77 (2), pp. 251-264, 2015.
- [10] E. Magid, T. Tsubouchi, E. Koyanagi, and T. Yoshida, "Building a search tree for a pilot system of a rescue search robotin a discretized random step environment, " vol. 23 (1), pp. 567-581, 2011.

- [11] K. Ramirez-Amaro, D.-L. E., and G. Cheng, "Robust semantic representations for inferring human comanipulation activities even with different demonstration styles," in IEEERAS Int. Conf. on Humanoid Robots, 2015, pp. 1141-1146.
- [12] R. Khusainov, A. Sagitov, A. Klimchik, and E. Magid, "Modelling of dynamically stable ar-601m robot locomotion in simulink." in Int. Conf. on Mechanical, System and Control Engineering, MATEC Web of Conf., 09004, vol. 75, 2016.
- [13] T. Ziemke and R. Lowe, "On the role of emotion in embodied cognitive architectures: From organisms to robots, " Cogn Comput, pp. 104-117, 2009.
- [14] E. Hudlicka, "Reasons for Emotions: Modeling Emotions in Integrated Cognitive Systems," in Integrated Models of Cognitive Systems, W. D. Gray, Ed. Oxford: Oxford University Press, 2007, pp. 263-278.
- [15] J. Martnez-Miranda and A. Aldea, "Emotions in human and artificial intelligence, " Computers in Human Behavior, vol. 21, no. 2, pp. 323-341, 2005. [Online]. Available: Http: //linkinghub. elsevier. com/retrieve/pii/S074756320400024X
- [16] J. Gratch and S. Marsella, "Evaluating a computational model of emotion," Autonomous Agents and Multi-Agent Systems, vol. 11, pp. 23-43, 2005.
- [17] A. Leukhin, M. Talanov, I. Sozutov, J. Vallverdú, and A. Toschev, "Simulation of a fear-like state on a model of dopamine system of rat brain, " in Advances in Intelligent Systems and Computing, Volume 449, 2016, Pages 121-126, 2016.
- [18] J. Vallverdú, M. Talanov, S. Distefano, M. Mazzara, A. Tchitchigin, and I. Nurgaliev, "A cognitive architecture for the implementation of emotions in computing systems," Biologically Inspired Cognitive Architectures, nov 2015.
- [19] A. Tchitchigin, M. Talanov, L. Safina, and M. Mazzara, Robot Dream. Cham: Springer International Publishing, 2016, pp. 291-298.
- [20] A. Tchitchigin, M. Talanov, and L. Safina, "Neuromorphic robot dream, " BioNanoScience, pp. 1-2, 2016.
- [21] R. W. Picard, E. Vyzas, and J. Healey, "Toward Machine Emotional Intelligence: Analysis of Affective Physiological State," vol. 23, no. 10, pp. 1175-1191, 2001.
- [22] R. W. Picard, Affective Computing. Massachusets Institute of Technology, 1997.
- [23] "What does it mean for a computer to "have" emotions" in Emotions in Humans and Artifacts, R. Trappl, P. Petta, and P. S., Eds., 2001.
- [24] M. Talanov, J. Vallverdu, S. Distefano, M. Mazzara, and R. Delhibabu, "Neuromodulating cognitive architecture: Towards biomimetic emotional ai, " in 2015 IEEE 29th International Conference on Advanced Information Networking and Applications, vol. 2015-April. IEEE, mar 2015, pp. 587-592.
- [25] P. O. Haikonen, "Example: An Experimental Robot with the HCA, " in Consciousness And Robot Sentience. World Scientific, 2012, pp. 203-224.
- [26] P. O. A. Haikonen, "Yes and No: Match/Mismatch Function in Cognitive Robots, " Cognitive Computation, vol. 6, no. 2, pp. 158-163, Jun. 2014. [Online]. Available: Http: //link. springer. com/10. 1007/s12559-013-9234-z
- [27] A. Toschev and M. Talanov, "Thinking lifecycle as an implementation of machine understanding in software maintenance automation domain, " Smart Innovation, Systems and Technologies, vol. 38, pp. 301-310, Nov. 2015.
- [28] A. Toschev, "Thinking model and machine understanding in automated user request processing, " CEUR Workshop Proceedings, vol. 1297, pp. 224-226, Nov. 2014.
- [29] M. Minsky, The society of mind. Simon & Schuster, 1988.
- [30] The Emotion Machine: Commonsense Thinking, Artificial Intelligence, and the Future of the Human Mind. Simon & Schuster, 2007.