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Towards Effective Interactive Teaching and Learning Strategies in Robotics Education

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Abstract

© 2017 IEEE. Robotics education is one of the most emerged and demanding fields of modern engineering education. To prepare skilled specialists for industrial needs it is important to create high-quality educational base. Intelligent Robotics Department takes its first steps in developing and implementing a new robotics educational program. This paper reviews Russian robotics education and describes our current work toward program establishing. To evaluate student motivation of connecting their education and further career with robotics we ran a survey among bachelor and master students, which have selected robotics subjects as elective courses. We present results and analysis of the survey, and elaborate on next steps of program development.

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Keywords

curriculum, Education, Master degree program, robotics, survey analysis

References

- [1] Y. P. Pokholkov, "National Doctrine of Advanced Engineering Education of Russia in the Context of New Industrialization: Approaches to Development, Objectives, and Principles, " Association of Engineering Education of Russia. Engineering education, vol. 10, pp. 50-65, Oct. 2012.
- [2] A. M. Erkmen, T. Tsubouchi and R. Murphy, "Mechatronics education, " IEEE Robot, Automation Mag, 8 (2), 4, 2001.
- [3] Z. A. Shiller, "Bottom-up approach to teaching robotics and mechatronics to mechanical engineers, " IEEE Transactions on Education, vol. 56 (1), pp, 103-109, 2013.
- [4] Atlas of new professions. Agency for Strategic Initiatives, an LNA "Skolkovo", Moscow, URL. : [Http: //www. skolkovo. ru/public/media/documents/research/sedec /SKOLKOVO-SEDeC-Atlas. pdf](http://www.skolkovo.ru/public/media/documents/research/sedec/SKOLKOVO-SEDeC-Atlas.pdf), 2014.
- [5] Kh. G. Tkhangapsoyev, M. M. Yakhutlov, "To the problems of engineering education in modern Russia, " In Quality Management, IEEE Conference on Transport and Information Security, Information Technologies, pp. 224-227, 2016.
- [6] I. A. Gurban and Jr, A. A. Tarasyev, "Global trends in education: Russia case study, " IFAC-PapersOnLine, vol. 49 (6), pp. 186-193, 2016.
- [7] Decree of the Government of the Russian Federation on December 8, 2011 2227-r on The Strategy for Innovative Development of the Russian Federation until 2020. // URL: [Http: //www. garant. ru/products/ipo/prime/doc/70006124/](http://www.garant.ru/products/ipo/prime/doc/70006124/), 2011.
- [8] M. Rosenblatt, H. Choset, "Designing and implementing handson robotics labs, " IEEE Intelligent Systems and their Applications, vol. 15 (6), pp. 32-39, 2000.
- [9] Kh. G. Tkhangapsoyev, M. M. Yakhutlov, "Problems of engineering education in modern Russia: The methods of analysis and ways of solving, " Higher education in Russia. No 8-9, pp. 27-36., 2014.

- [10] E. I. Yurevich, "Basics of robotics, " 3rd edition, Saint Petersburg, BKHV Petersburg, 360 p., 2010.
- [11] Official message of the President of Russian Federation to Federal Committee, <http://kremlin.ru/events/president/news/53379>, 01. 12. 2016.
- [12] Round table "Development of Russian market of industrial robotics", URL. : [Http://www. controlengrussia.com/innovatsii/robotics/](Http://www.controlengrussia.com/innovatsii/robotics/), 2016.
- [13] N. Hativa, R. Barak, and E. Simhi, "Exemplary university teachers: Knowledge and beliefs regarding effective teaching dimensions and strategies, " *Journal of Higher Education*, vol. 72 (6), pp. 699-729, 2001.
- [14] J. J. Craig, "Introduction to Robotics, " 3rd ed., Pearson/Prentice Hall, 2005.
- [15] P. Corke, "Robotics, vision and control: Fundamental algorithms in MATLAB, " Springer, 2011.
- [16] G. Dudek, M. Jenkin, "Computational principles of mobile robotics, " Cambridge University Press, 2010.
- [17] K. S. Bordens, B. B. Abbott, "Research design and methods: A process approach, " McGraw-Hill, 2002.
- [18] E. Magid, T. Tsubouchi, "Static Balance for Rescue Robot Navigation : Discretizing Rotational Motion within Random Step Environment, " *Lecture Notes In Artificial Intelligence*, Vol. 6472, Proc. International Conference on Simulation, Modeling, and Programming for Autonomous Robot, pp. 423-435, 2010.
- [19] E. Magid, E. Rivlin, "CAUTIOUSBUG: A Competitive Algorithm for Sensory-Based Robot Navigation, " *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp. 2757-2762, 2004.
- [20] S. L. Zenkevich, A. S. Yushchenko. "Basics of manipulation robots control, " 2nd edition, . : Bauman State Technical University publishing, 2004.
- [21] Y. V. Poduraev, "Mechatronics: Basics, methods, application, " 2nd edition, Moscow : Mashinostroenie, 2007.