

Dr Zoran Miljković



Personal data

Address:

University of Belgrade
Faculty of Mechanical Engineering,
Kraljice Marije 16,
11120 Belgrade 35, Serbia

E-mail:

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Nationality:

Serbian

Research or academic title

Full Professor

Research field/area

Mechanical engineering / Robotics and Artificial Intelligence, Machining Technology, Intelligent Manufacturing Systems, Mechatronics, Autonomous Systems and Machine Learning, Development and Application of Artificial Neural Networks in Manufacturing Technologies, Group Technologies, Innovation in Higher Engineering Education.

Languages

Serbian, English, German

Education

- 2000** | **Doctor of technical sciences (PhD - Mech.Eng.)**
University of Belgrade - Faculty of Mechanical Engineering,
Department for Production Engineering
Dissertation title: Development of Control Algorithms for Autonomous Industrial Robots Based on the Recognition System and Learning
- 1994** | **Magister Scientiae – MSc - Mech. Eng. (four semesters & thesis-research prerequisite to PhD)**
University of Belgrade - Faculty of Mechanical Engineering,
Department for Production Engineering
Thesis title: Research and Development of Microrobot for Assembly of Mechatronic Fits
- 1988** | **Dipl.-Ing. (ten semesters with diploma work)**
University of Belgrade - Faculty of Mechanical Engineering,
Department for Production Engineering
Thesis title: Warehousing Automation System

Employment

- Feb. 1990-Present** | **Full Professor (since 10th November 2010)**
University of Belgrade - Faculty of Mechanical Engineering,
Department for Production Engineering
- Jan. 1989 – Jan. 1990** | **Designer - constructor of food equipment**
Minel - food equipment
Pančevo - Belgrade
- Nov. 1988 – Jan. 1989** | **Technical subjects teacher**
Technical centre - “Radoje Dakić”
Belgrade

Experience in competitive public calls in previous 5 years

MISSION4.0

Project name: *Deep machine learning and swarm intelligence-based optimization algorithms for control and scheduling of cyber-physical systems in Industry 4.0 - MISSION4.0*, Grant: 6523109 **Relevant Project for MCSecurity**

Funding source: Science Fund of the Republic of Serbia

Implementation period: 2020-2022.

Awarded grant amount: 199,949.18 EUR

Project PI: Zoran Miljković

Role of Zoran Miljković: Project PI

Number of citations (excluded self-citations, source: Scopus)

1159

Hirsch index (excluded self-citations, source: Scopus)

16

Other information

- Industrial robots programming;
- Experience in educational activities: "Curriculum Development and ECTS at the University of Belgrade – Faculty of Mechanical Engineering";
- External expert (2006-2024) assisting to "Research Executive Agency - REA" (Established by European Commission – Brussels);
- Evaluator of *Tempus* and *Erasmus Mundus* proposals (2009-2013) within the "EACEA/07 – Executive Agency" (Established by European Commission – Brussels);
- Miljković, Z., Petrović, M.M., **INTELLIGENT MANUFACTURING SYSTEMS** – with robotics and artificial intelligence backgrounds, Textbook (ISBN 978-86-6060-071-6) XXVIII+409 p., University of Belgrade - Faculty of Mechanical Engineering, Belgrade, 2021 (I edition);
- Miljković, Z., **Systems of artificial neural networks in production technologies**, Scientific monograph book (ISBN 86-7083-455-3) VI+185 p., University of Belgrade - Faculty of Mechanical Engineering, Belgrade, (2003);

KEY RESULTS OF MISSION4.0:

Journal papers:

1. Jokić, A., Petrović, M., Miljković, Z., **Semantic Segmentation Based Stereo Visual Servoing of Nonholonomic Mobile Robot in Intelligent Manufacturing Environment**, Journal Expert Systems with Applications, Vol. 190, paper no. 116203, 2022, ISSN: 0957-4174, DOI: 10.1016/j.eswa.2021.116203, <https://www.sciencedirect.com/science/article/abs/pii/S0957417421015189> (Science Citation Index-Web of Science® – IF = 8.665 (2021) → M21a; source KoBSON) **Relevant Publication for MCSecurity**
2. Petrović, M., Ciezkowski, M., Romaniuk, S., Wolniakowski, A., Miljković, Z., **A Novel Hybrid NN-ABPE-Based Calibration Method for Improving Accuracy of Lateration Positioning System**, Journal Sensors, Vol. 21 Issue 24, paper no. 8204, 2021, eISSN 1424-8220, DOI: 10.3390/s21248204, <https://www.mdpi.com/1424-8220/21/24/8204> (Science Citation Index-Web of Science® – IF = 3.847 (2021) → M21; source KoBSON) **Relevant Publication for MCSecurity**
3. Petrović, M., Jokić, A., Miljković, Z., Kulesza, Z., **Multi-Objective Scheduling of Single Mobile Robot Based on Grey Wolf Optimization Algorithm**, Applied Soft Computing, Vol. 131, paper no. 109784, 2022, ISSN: 1568-4946, DOI: 10.1016/j.asoc.2022.109784, <https://doi.org/10.1016/j.asoc.2022.109784> (Science Citation Index-Web of Science® – IF = 8.7 (2022) → M21; source KoBSON) **Relevant Publication for MCSecurity**
4. Đokić, L., Jokić, A., Petrović, M., Slavković, N., Miljković, Z., **Application of Metaheuristic Optimization Algorithms for Image Registration in Mobile Robot Visual Control**, Serbian Journal of Electrical Engineering, Vol. 18 No. 2, pp. 155-170, 2021, ISSN: 1451-4869, e-ISSN: 2217-7183, DOI: 10.2298/SJEE2102155D, <https://sjee.ftn.kg.ac.rs/index.php/sjee/article/view/651> (2021) → M52
5. Jokić, A., Đokić, L., Petrović, M., Miljković, Z., **Data Augmentation Methods for Semantic Segmentation-based Mobile Robot Perception System**, Serbian Journal of Electrical Engineering, Vol. 19 No. 3, pp. 291-302, 2022, ISSN: 1451-4869, e-ISSN: 2217-7183, <https://doi.org/10.2298/SJEE2203291J> http://www.journal.ftn.kg.ac.rs/Vol_19-3/ (2022) → M52

- Miljković, Z., Aleksendrić, D.,
Artificial neural networks – solved examples with short theory background, Textbook 2009 (I edition - ISBN 978-86-7083-685-3) & 2018 (II edition - ISBN 978-86-7083-961-8), VI+225 p., University of Belgrade - Faculty of Mechanical Engineering, Belgrade;
- Kalajdžić, M., (Editor), Tanović, Lj., Babić, B., Glavonjić, M., Miljković, Z., et al., **Cutting Technology**, Manual-Auxiliary Textbook 1998 (I edition), 1999 (II edition), 2001 (III edition), 2004 (IV edition), 2006 (V edition), 2008 (VI edition), 2012 (VII edition), 2017 (VIII edition), 2021 (IX edition - ISBN 978-86-6060-097-6), LXXIX+453 p., University of Belgrade - Faculty of Mechanical Engineering, Belgrade.
- Robotics and Autonomous Systems - Certificate of Outstanding Contribution in Reviewing, awarded July 2017 in recognition of the contribution made to the quality of the journal.
- Applied Soft Computing Journal - Certificate of Outstanding Contribution in Reviewing, awarded October 2017 in recognition of the contribution made to the quality of the journal.
- Certificate of Reviewing - Expert Systems with Applications. Awarded in recognition of the review contributed to the journal in December 2014 (7 reviews).
- Certificate of Reviewing - Swarm and Evolutionary

Conference papers:

6. Đokić, L., Jokić, A., Petrović, M., **Miljković, Z., Biologically Inspired Optimization Methods for Image Registration in Visual Servoing of a Mobile Robot**, Proceedings of the 7th International Conference on Electrical, Electronics and Computing Engineering (IcETRAN 2020), pp. (ROI2.2) 715-720 (ISBN 978-86-7466-852-8), Beograd, Serbia, 28-29 September, 2020.
7. **Miljković, Z., Petrović, M., A Survey of Swarm Intelligence-based Optimization Algorithms for Tuning of Cascade Control Systems: Concepts, Models and Applications**, Plenary Session - **Invited paper (M31)**, Proceedings of the 5th International Conference - Mechanical Engineering in XXI Century (MASING 2020), pp. 3-8 (ISBN 978-86-6055-139-1), Niš, Serbia, 9-10 December, 2020.
8. Jokić, A., Đokić, L., Petrović, M., **Miljković, Z., A Mobile Robot Visual Perception System Based on Deep Learning Approach**, Proceedings of the 8th International Conference on Electrical, Electronics and Computing Engineering (IcETRAN 2021), pp. (ROI1.3) 568-572 (ISBN 978-86-7466-894-8), Stanišići, Republic of Bosnia & Herzegovina, 8-10 September, 2021,
https://www.etrans.rs/2021/zbornik/Papers/114_ROI_1.3.pdf
9. **Miljković, Z., Jevtić, Đ., Svorcan, J., Reinforcement Learning Approach for Autonomous UAV Navigation in 3D Space**, Proceedings of the 14th International Scientific Conference MMA 2021 – Flexible Technologies, pp. 189-192, Novi Sad, Serbia, 23-25 September, 2021.
10. **Miljković, Z., Đokić, L., Petrović, M., Object Detection and Tracking in Cooperative Multi-Robot Transportation**, Proceedings of the 38th International Conference on Production Engineering, pp. 137-143, Čačak, Serbia, 14-15 October, 2021.
11. Jokić, A., Petrović, M., **Miljković, Z., Mobile Robot Decision-making System Based on Deep Machine Learning**, Proceedings of the 9th International Conference on Electrical, Electronics and Computing Engineering (IcETRAN 2022), pp. (ROI1.1) 635-638 (ISBN 978-86-7466-930-3), Novi Pazar, Republic of Serbia, 6-9 June, 2022,
https://www.etrans.rs/2022/zbornik/ICETRAN-22_radovi/078-ROI1.1.pdf
12. Petrović, M., Jokić, A., **Miljković, Z., Kulesza, Z., Multi-Objective Population-based Optimization Algorithms for Scheduling of Manufacturing Entities**,

Computation. Awarded in recognition of the review contributed to the journal in July 2018 (2 reviews).

- Certificate of Reviewing - Neurocomputing. Awarded in recognition of the review contributed to the journal in December 2017 (1 review).
- Certificate of Reviewing - Engineering Applications of Artificial Intelligence. Awarded in recognition of the review contributed to the journal in June 2014 (1 review).

Proceedings of the 26th International Conference on Methods and Models in Automation and Robotics (MMAR 2022) ISBN: 978-1-6654-6857-2, pp. 403-407, **IEEE Xplore:** 8 September 2022, (DOI: [10.1109/MMAR55195.2022.9874301](https://doi.org/10.1109/MMAR55195.2022.9874301)), Międzyzdroje, Poland, 22-25 August, 2022, <http://dx.doi.org/10.1109/mmar55195.2022.9874301>

Technical solutions:

13. Jokić, A., Petrović, M., Miljković, Z., Babić, B., **Mobile robot stereo visual perception system based on deep machine learning** (In Serbian), Technical solution, 2021 (M85). **Relevant Algorithm for MCSecurity**

Datasets:

14. Jokić, A., Petrović, M., Miljković, Z., **Dataset for semantic segmentation of the laboratory model of manufacturing environment** (Version 0.1.0) [Data set]. Zenodo, [http://doi.org/10.5281/zenodo.4138944](https://doi.org/10.5281/zenodo.4138944), 2020. **Relevant Dataset for MCSecurity**

Additional 2 publications relevant for MCSecurity (3 are listed as key references 1, 2 and 3 of MISSION4.0)

1. Miljković, Z., Jokić, A., Petrović, M., **Image Registration Algorithm for Deep Learning-Based Stereo Visual Control of Mobile Robots**, Chapter 13 (M13) printed in the scientific monograph book: *Deep Learning for Unmanned Systems*, Edited by Anis Koubaa & Ahmad Taher Azar, Series: *Studies in Computational Intelligence* (Volume 984), (ISBN 978-3-030-77938-2 & eBook ISBN 978-3-030-77939-9). printed by Springer Cham, https://doi.org/10.1007/978-3-030-77939-9_13, pp. 447-479, October 2, 2021. **Relevant Publication for MCSecurity**
2. Miljković, Z., Đokić, L., Petrović, M., **Application of convolutional neural networks for visual control of intelligent robotic systems**, Chapter 3 (M13) printed in the scientific monograph book: *Soft Computing in Smart Manufacturing - Solutions toward Industry 5.0*, Edited by Tatjana Šibalija & J. Paulo Davim, Series: [Advanced Mechanical Engineering](https://doi.org/10.1515/9783110693225-003) (Volume 7), (ISBN 978-3-11-069317-1 & eBook ISBN 978-3-11-069322-5 & ISSN 2367-3796), pp. 83-112, © 2022 Walter de Gruyter GmbH, Berlin/Boston, Available online: December 6, 2021. (<https://doi.org/10.1515/9783110693225-003>), Published by De Gruyter, 2022. **Relevant Publication for MCSecurity**

Additional 3 projects relevant for MCSecurity

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|------------------------|---|
| 2020– 2023 | Popović, V., Babić, B., Miljković, Z. , Jakovljević, Ž., Petrović, M., et al. <i>Integrated research in macro, micro, and nano mechanical engineering – Deep learning of intelligent manufacturing systems in production engineering</i> , Project financed by the Ministry of Education, Science and Technological Development of the Serbian Government, under the contract number 451-03-68/2022-14/200105 |
| 2011 - 2019 | Babić, B., Miljković, Z. , Jakovljević, Ž., et al. <i>An Innovative, Ecologically Based Approach to the Implementation of Intelligent Manufacturing Systems for the Production of Sheet Metal Parts</i> , Grant: TR-35004, Project funded by Ministry of Education, Science and Technological Development of the Government of the Republic of Serbia |
| 2008 - 2010 | Babić, B., Miljković, Z. , Bojović, B., Vuković, N., Mitić, M., <i>Flexible Automation and Implementation of Intelligent Manufacturing Systems in domain of Sheet Metal Parts Production</i> , Grant: TR-14031, Project funded by Ministry of Science and Technological Development of the Government of the Republic of Serbia |

Additional 3 products, services related to MCSecurity (2 are listed as key references 13 and 14 of MISSION4.0)

1. **Miljković, Z., BPnet** - "Back-Propagation" artificial neural network (software with citation in projects: 11E08PT1 and MIS.3.02.0127.B. - Ministry of Science and Technological Development – Government of the Republic of Serbia), 2000.
2. **Miljković, Z., ART Simulator** - "Adaptive Resonance Theory" artificial neural network (software with citation in projects: 11E08PT1, S.5.33.69.0144 and MIS.3.02.0127.B. - Ministry of Science and Technological Development – Government of the Republic of Serbia), 2000.
3. **Miljković, Z., Physical Model of Jointed-arm Mobile Robot Configuration** (anthropomorphic mobile robot named Don Kihot), Technical solution, University of Belgrade, Faculty of Mechanical Engineering, 2000.