

DAFTAR PUSTAKA

- [1] O. M. U. Eraliev, K.-H. Lee, D.-Y. Shin, and C.-H. Lee, "Sensing, perception, decision, planning and action of autonomous excavators," *Automation in Construction*, vol. 141, p. 104428, 9 2022.
- [2] A. Suhandi and N. Nazaruddin, "Modifikasi serta pengujian sistem control dan sistem swing model excavator," *Jurnal Online Mahasiswa Fakultas Teknik Universitas Riau*, vol. 2, pp. 1–11, 2015.
- [3] D. Huo, J. Chen, H. Zhang, Y. Shi, and T. Wang, "Intelligent prediction for digging load of hydraulic excavators based on rbf neural network," *Measurement*, vol. 206, p. 112210, 1 2023.
- [4] J. M. D. Delgado and L. Oyedele, "Robotics in construction: A critical review of the reinforcement learning and imitation learning paradigms," *Advanced Engineering Informatics*, vol. 54, p. 101787, 10 2022.
- [5] G. Chen, Y. Lu, X. Yang, and H. Hu, "Reinforcement learning control for the swimming motions of a beaver-like, single-legged robot based on biological inspiration," *Robotics and Autonomous Systems*, vol. 154, p. 104116, 8 2022.
- [6] P. K. Singh and C. M. Krishna, "Continuum arm robotic manipulator: A review," *Universal Journal of Mechanical Engineering*, vol. 2, pp. 193–198, 6 2014.
- [7] S. Kucuk and Z. Bingul, "The inverse kinematics solutions of industrial robot manipulators," in *Proceedings of the IEEE International Conference on Mechatronics, 2004. ICM '04.*, 2004, pp. 274–279.
- [8] Sumardi, L. Febriramadhan, and A. Triwiyatno, "Design of color based object sorting through arm manipulator with inverse kinematics method," in *2016 3rd International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE)*, 2016, pp. 117–122.
- [9] K. Lynch and F. Park, *Modern Robotics*. Cambridge University Press, 2017. [Online]. Available: <https://books.google.co.id/books?id=5NzFDgAAQBAJ>
- [10] T. H. Noventino, M. R. Rosa, and A. Z. Fuadi, "Pid control design and kinematic modelling of 3-dof robot manipulator," in *2022 International Conference on Electrical Engineering, Computer and Information Technology (ICEECIT)*, 2022, pp. 88–94.
- [11] E. Seidi, A. M. Shafei, and M. H. Korayem, "Derivation of dynamic equations and parametric analysis for dual arm mobile manipulators using recursive gibbs-appell formulation," in *2014 Second RSI/ISM International Conference on Robotics and Mechatronics (ICRoM)*, 2014, pp. 631–635.
- [12] A. Toquica, L. O. Martinez, R. Rodriguez, A. C. Chavarro, and T. Cardozo, "Kinematic modelling of a robotic arm manipulator using matlab," *Journal of engineering and applied sciences*, vol. 12, no. 7, 2017.

- [13] B. Patel and J. Prajapati, "A review on kinematics of hydraulic excavator's backhoe attachment," *Article in International Journal of Engineering Science and Technology*, 2011. [Online]. Available: <https://www.researchgate.net/publication/50946287>
- [14] J. Iqbal, R. U. Islam, H. Khan *et al.*, "Modeling and analysis of a 6 dof robotic arm manipulator," *Canadian Journal on Electrical and Electronics Engineering*, vol. 3, no. 6, pp. 300–306, 2012.
- [15] S. Rao and P. Bhatti, "Probabilistic approach to manipulator kinematics and dynamics," *Reliability Engineering & System Safety*, vol. 72, no. 1, pp. 47–58, 2001. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S095183200000106X>
- [16] A. A. Mohammed and M. Sunar, "Kinematics modeling of a 4-dof robotic arm," in *2015 International Conference on Control, Automation and Robotics*, 2015, pp. 87–91.
- [17] A.-V. Duka, "Neural network based inverse kinematics solution for trajectory tracking of a robotic arm," *Procedia Technology*, vol. 12, pp. 20–27, 2014. [Online]. Available: <https://doi.org/10.1016/j.protcy.2013.12.451>
- [18] V. Toma, G. Olaru, A. Ștefan, M. Lupoae, D. Constantin, and C. Molder, "Considerations on the kinematics analysis of an eod robot's manipulator," in *2022 14th International Conference on Electronics, Computers and Artificial Intelligence (ECAI)*, 2022, pp. 1–6.
- [19] C. Rocha, C. Tonetto, and A. Dias, "A comparison between the denavit–hartenberg and the screw-based methods used in kinematic modeling of robot manipulators," *Robotics and Computer-Integrated Manufacturing*, vol. 27, no. 4, pp. 723–728, 2011, conference papers of Flexible Automation and Intelligent Manufacturing. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S073658451100010X>
- [20] A. R. A. Tahtawi, M. Agni, and T. D. Hendrawati, "Small-scale robot arm design with pick and place mission based on inverse kinematics," *Journal of Robotics and Control (JRC)*, vol. 2, no. 6, 2021. [Online]. Available: <https://doi.org/10.18196/jrc.26124>
- [21] R. Köker, "A genetic algorithm approach to a neural-network-based inverse kinematics solution of robotic manipulators based on error minimization," *Information Sciences*, vol. 222, pp. 528–543, Feb. 2013. [Online]. Available: <https://doi.org/10.1016/j.ins.2012.07.051>
- [22] C. Lopez-Franco, J. Hernandez-Barragan, A. Y. Alanis, and N. Arana-Daniel, "A soft computing approach for inverse kinematics of robot manipulators," *Engineering Applications of Artificial Intelligence*, vol. 74, pp. 104–120, Sep. 2018. [Online]. Available: <https://doi.org/10.1016/j.engappai.2018.06.001>
- [23] S. Kucuk and Z. Bingul, "Inverse kinematics solutions for industrial robot manipulators with offset wrists," *Applied Mathematical Modelling*, vol. 38, no.

- 7-8, pp. 1983–1999, Apr. 2014. [Online]. Available: <https://doi.org/10.1016/j.apm.2013.10.014>
- [24] S. Akram and Q. U. Ann, “Newton raphson method,” *International Journal of Scientific & Engineering Research*, vol. 6, no. 7, pp. 1748–1752, 2015.
 - [25] S. Lee, J. Lee, J. Bang, and J. Lee, “7 dof manipulator construction and inverse kinematics calculation and analysis using newton-raphson method,” in *2021 18th International Conference on Ubiquitous Robots (UR)*, 2021, pp. 235–238.
 - [26] D. Di Vito, C. Natale, and G. Antonelli, “A comparison of damped least squares algorithms for inverse kinematics of robot manipulators **this work was supported by the european community through theprojectsrobust(h2020-690416),euroc(fp7-608849), dexrov (h2020-635491) and aeroarms (h2020-644271).” *IFAC-PapersOnLine*, vol. 50, no. 1, pp. 6869–6874, 2017, 20th IFAC World Congress. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S2405896317317159>
 - [27] G. Mustofa, S. Tangkuman, and H. Luntungan, “Simulasi kinematika mekanisme lengan backhoe excavator,” *Jurnal Poros Teknik Mesin UNSRAT*, vol. 7, no. 1, 2018.
 - [28] A. R. Enes and W. J. Book, “Optimizing point to point motion of net velocity constrained manipulators,” in *49th IEEE Conference on Decision and Control (CDC)*, 2010, pp. 6415–6420.
 - [29] H. Park, S. Lee, B. Chu, and D. Hong, “Obstacle avoidance for robotic excavators using a recurrent neural network,” in *2008 International Conference on Smart Manufacturing Application*, 2008, pp. 585–590.
 - [30] L. Hitachi Construction Machinery Co., “The benefits of using an excavator for your next construction project,” <https://www.hitachicm.com.au/the-benefits-of-using-an-excavator-for-your-next-construction-project/>, Accessed 2023.
 - [31] H. Feng, C.-B. Yin, W. wen Weng, W. Ma, J. jing Zhou, W. hua Jia, and Z. li Zhang, “Robotic excavator trajectory control using an improved ga based pid controller,” *Mechanical Systems and Signal Processing*, vol. 105, pp. 153–168, 5 2018.
 - [32] A. Koivo, M. Thoma, E. Kocaoglan, and J. Andrade-Cetto, “Modeling and control of excavator dynamics during digging operation,” *Journal of aerospace engineering*, vol. 9, no. 1, pp. 10–18, 1996.
 - [33] B. Lee and H. Kim, “Trajectory generation for an automated excavator.” *IEEE*, 10 2014, pp. 716–719.
 - [34] P. Egli, D. Gaschen, S. Kerscher, D. Jud, and M. Hutter, “Soil-adaptive excavation using reinforcement learning,” *IEEE Robotics and Automation Letters*, vol. 7, pp. 9778–9785, 10 2022.
 - [35] Y. Ye, C.-B. Yin, Y. Gong, and J. jing Zhou, “Position control of nonlinear hydraulic system using an improved pso based pid controller,” *Mechanical Systems and Signal Processing*, vol. 83, pp. 241–259, 1 2017.

- [36] X. Zhang, S. Qiao, L. Quan, and L. Ge, "Velocity and position hybrid control for excavator boom based on independent metering system," *IEEE Access*, vol. 7, pp. 71 999–72 011, 2019.
- [37] D. Jud, P. Leemann, S. Kerscher, and M. Hutter, "Autonomous free-form trenching using a walking excavator," *IEEE Robotics and Automation Letters*, vol. 4, pp. 3208–3215, 10 2019.
- [38] M. Van Otterlo and M. Wiering, "Reinforcement learning and markov decision processes," *Reinforcement learning: State-of-the-art*, pp. 3–42, 2012.
- [39] X. Wang, S. Wang, X. Liang, D. Zhao, J. Huang, X. Xu, B. Dai, and Q. Miao, "Deep reinforcement learning: A survey," *IEEE Transactions on Neural Networks and Learning Systems*, pp. 1–15, 2022.
- [40] R. S. Sutton and A. G. Barto, *Reinforcement learning: An introduction*. MIT press, 2018.
- [41] S. Padakandla, "A survey of reinforcement learning algorithms for dynamically varying environments," 2020. [Online]. Available: <https://arxiv.org/abs/2005.10619>
- [42] L. Kaiser, M. Babaeizadeh, P. Milos, B. Osinski, R. H. Campbell, K. Czechowski, D. Erhan, C. Finn, P. Kozakowski, S. Levine, A. Mohiuddin, R. Sepassi, G. Tucker, and H. Michalewski, "Model-based reinforcement learning for atari," 2019. [Online]. Available: <https://arxiv.org/abs/1903.00374>
- [43] T. P. Lillicrap, J. J. Hunt, A. Pritzel, N. Heess, T. Erez, Y. Tassa, D. Silver, and D. Wierstra, "Continuous control with deep reinforcement learning," 2015. [Online]. Available: <https://arxiv.org/abs/1509.02971>
- [44] M. Lapan, *Deep Reinforcement Learning Hands-On: Apply modern RL methods, with deep Q-networks, value iteration, policy gradients, TRPO, AlphaGo Zero and more*. Packt Publishing Ltd, 2018.
- [45] V. Mnih, K. Kavukcuoglu, D. Silver, A. Graves, I. Antonoglou, D. Wierstra, and M. Riedmiller, "Playing atari with deep reinforcement learning," 2013. [Online]. Available: <https://arxiv.org/abs/1312.5602>
- [46] D. Bick and M. Wiering, "Towards delivering a coherent self-contained explanation of proximal policy optimization," Ph.D. dissertation, 2021.
- [47] T. Tiong, I. Saad, K. T. K. Teo, and H. B. Lago, "Autonomous valet parking with asynchronous advantage actor-critic proximal policy optimization," in *2022 IEEE 12th Annual Computing and Communication Workshop and Conference (CCWC)*. IEEE, Jan. 2022. [Online]. Available: <https://doi.org/10.1109/ccwc54503.2022.9720881>
- [48] C. Xu, R. Zhu, and D. Yang, "Karting racing: A revisit to ppo and sac algorithm," in *2021 International Conference on Computer Information Science and Artificial Intelligence (CISAI)*. IEEE, 2021, pp. 310–316.

- [49] J. Schulman, F. Wolski, P. Dhariwal, A. Radford, and O. Klimov, "Proximal policy optimization algorithms," 2017. [Online]. Available: <https://arxiv.org/abs/1707.06347>
- [50] H.-K. Lim, J.-B. Kim, J.-S. Heo, and Y.-H. Han, "Federated reinforcement learning for training control policies on multiple iot devices," *Sensors*, vol. 20, no. 5, p. 1359, 2020.
- [51] Y. LeCun, Y. Bengio, and G. Hinton, "Deep learning," *Nature*, vol. 521, no. 7553, pp. 436–444, May 2015. [Online]. Available: <https://doi.org/10.1038/nature14539>
- [52] V. Mnih, K. Kavukcuoglu, D. Silver, A. A. Rusu, J. Veness, M. G. Bellemare, A. Graves, M. Riedmiller, A. K. Fidjeland, G. Ostrovski, S. Petersen, C. Beattie, A. Sadik, I. Antonoglou, H. King, D. Kumaran, D. Wierstra, S. Legg, and D. Hassabis, "Human-level control through deep reinforcement learning," *Nature*, vol. 518, no. 7540, pp. 529–533, Feb. 2015. [Online]. Available: <https://doi.org/10.1038/nature14236>
- [53] D. Silver, A. Huang, C. J. Maddison, A. Guez, L. Sifre, G. van den Driessche, J. Schrittwieser, I. Antonoglou, V. Panneershelvam, M. Lanctot, S. Dieleman, D. Grewe, J. Nham, N. Kalchbrenner, I. Sutskever, T. Lillicrap, M. Leach, K. Kavukcuoglu, T. Graepel, and D. Hassabis, "Mastering the game of go with deep neural networks and tree search," *Nature*, vol. 529, no. 7587, pp. 484–489, Jan. 2016. [Online]. Available: <https://doi.org/10.1038/nature16961>
- [54] K. Arulkumaran, M. P. Deisenroth, M. Brundage, and A. A. Bharath, "A brief survey of deep reinforcement learning," 2017. [Online]. Available: <https://arxiv.org/abs/1708.05866>
- [55] A. Irpan, "Deep reinforcement learning doesn't work yet," <https://www.alexirpan.com/2018/02/14/rl-hard.html>, 2018.
- [56] Z. Xu, K. Panaganti, and D. Kalathil, "Improved sample complexity bounds for distributionally robust reinforcement learning," 2023. [Online]. Available: <https://arxiv.org/abs/2303.02783>
- [57] M. A. Alrifai, "Probabilistic model checking of distributed machine learning systems," Ph.D. dissertation, KTH Royal Institute of Technology, Stockholm, Sweden, 2020. [Online]. Available: <https://kth.diva-portal.org/smash/get/diva2:1415901/FULLTEXT01.pdf>
- [58] J. Schulman, P. Moritz, S. Levine, M. Jordan, and P. Abbeel, "High-dimensional continuous control using generalized advantage estimation," 2015. [Online]. Available: <https://arxiv.org/abs/1506.02438>
- [59] T. Nguyen, "Generalized advantage estimate: Maths and code," *Towards Data Science*, 2018. [Online]. Available: <https://towardsdatascience.com/generalized-advantage-estimate-maths-and-code-b5d5bd3ce737>
- [60] Y. Gu, Y. Cheng, C. L. P. Chen, and X. Wang, "Proximal policy optimization with policy feedback," *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 52, no. 7, pp. 4600–4610, 2022.

- [61] P. Agarwal, M. Teichmann, S. Andrews, and S. E. Kahou, "Automatic evaluation of excavator operators using learned reward functions," 11 2022. [Online]. Available: <http://arxiv.org/abs/2211.07941>
- [62] Q. Lu, Y. Zhu, and L. Zhang, "Excavation reinforcement learning using geometric representation," *IEEE Robotics and Automation Letters*, vol. 7, pp. 4472–4479, 4 2022.
- [63] P. Egli and M. Hutter, "Towards rl-based hydraulic excavator automation." *IEEE*, 10 2020, pp. 2692–2697.
- [64] —, "A general approach for the automation of hydraulic excavator arms using reinforcement learning," *IEEE Robotics and Automation Letters*, vol. 7, pp. 5679–5686, 4 2022.
- [65] E. Coumans and Y. Bai, "Pybullet, a python module for physics simulation for games, robotics and machine learning," <http://pybullet.org>, 2016–2019.
- [66] A. Raffin, A. Hill, A. Gleave, A. Kanervisto, M. Ernestus, and N. Dormann, "Stable-baselines3: Reliable reinforcement learning implementations," *Journal of Machine Learning Research*, vol. 22, no. 268, pp. 1–8, 2021. [Online]. Available: <http://jmlr.org/papers/v22/20-1364.html>