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Evaluasi Komparatif Algoritma Machine Learning untuk Deteksi Jatuh Berbasis Inertial Measurement Unit Menggunakan Dataset Sisfall
Najwa Zahra Ramadhani, Dr.Eng. Ir. Adha Imam Cahyadi, S.T., M.Eng., IPM.; Ir. Prapto Nugroho, S.T., M.Eng., D.Er
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DAFTAR PUSTAKA

[1] F. A. Rashid, K. Sandrasegaran, and X. Kong, "Simulation of sisfall dataset for fall detection using matlab classifier algorithms," in *2021 12th International Symposium on Parallel Architectures, Algorithms and Programming (PAAP)*, 2021, pp. 62–68.

[2] World Health Organization, "Falls," 2021, accessed 2026. [Online]. Available: https://www.who.int/news-room/fact-sheets/detail/falls

[3] S. L. James *et al.*, "The global burden of falls: Global, regional and national estimates of morbidity and mortality from the global burden of disease study 2017," *Injury Prevention*, vol. 26, no. Suppl 1, pp. i3–i11, 2020.

[4] M. Kuczawski, F. Sampson, C. Cotterill, J. Lewis, R. Pilbery, L. Jones, S. Mason, J. Coster, L. Wilson, V. Ngwa, S. Dixon, S. Elsmere, P. Gleeson, and F. Bell, "Understanding the scale, impact, and care trajectory for patients who experience a long lie after a fall: Mixed methods study protocol," *NIHR Open Research*, vol. 6, p. 19, 2026.

[5] J. Kubitza, I. T. Schneider, and B. Reuschenbach, "Concept of the term long lie: A scoping review," *European Review of Aging and Physical Activity*, vol. 20, p. 16, 2023.

[6] Z. Wang, V. Ramamoorthy, U. Gal, and A. Guez, "Possible life saver: A review on human fall detection technology," *Robotics*, vol. 9, no. 3, p. 55, 2020.

[7] S. Majumder, E. Aghayi, M. Noferesti, H. Memarzadeh-Tehran, T. Mondal, Z. Pang, and M. J. Deen, "Smart homes for elderly healthcare—recent advances and research challenges," *Sensors*, vol. 17, no. 11, p. 2496, 2017.

[8] S. Subramaniam, A. I. Faisal, and M. J. Deen, "Wearable sensor systems for fall risk assessment: A review," *Frontiers in Digital Health*, vol. 4, p. 921506, 2022.

[9] S. O. H. Madgwick, A. J. L. Harrison, and R. Vaidyanathan, "Estimation of imu and marg orientation using a gradient descent algorithm," in *Proceedings of the 2011 IEEE International Conference on Rehabilitation Robotics (ICORR)*, 2011, pp. 1–7.

[10] N. Zurbuchen, A. Wilde, and P. Bruegger, "A machine learning multi-class approach for fall detection systems based on wearable sensors with a study on sampling rates selection," *Sensors*, vol. 21, no. 3, p. 938, 2021.

[11] J. Alizadeh, M. Bogdan, J. Classen, and C. Fricke, "Support vector machine classifiers show high generalizability in automatic fall detection in older adults," *Sensors*, vol. 21, no. 21, p. 7166, 2021.

[12] Á. Sucerquia, J. D. López, and J. F. Vargas-Bonilla, "Sisfall: A fall and movement dataset," *Sensors*, vol. 17, no. 1, p. 198, 2017.

[13] World Health Organization, "Who global report on falls prevention in older age," World Health Organization, Tech. Rep., 2007. [Online]. Available: https://www.who.int/publications/i/item/9789241563536

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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

[14] J. He, S. Bai, and X. Wang, "An unobtrusive fall detection and alerting system based on kalman filter and bayes network classifier," *Sensors*, vol. 17, no. 6, p. 1393, 2017.

[15] Y. Cai, J. Chen, Q. He, J. Mou, and D. Camacho, "Fall monitoring with single imu: A large-scale dataset and a novel dual-branch network," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol. 34, pp. 287–299, 2026.

[16] Y. Ge and B. Xu, "Detecting falls using accelerometers by adaptive thresholds in mobile devices," *Journal of Computers*, vol. 9, no. 7, pp. 1553–1559, 2014.

[17] M. N. Nyan, F. E. H. Tay, A. W. Y. Tan, and K. H. W. Seah, "Distinguishing fall activities from normal activities by angular rate characteristics and high-speed camera characterization," *Medical Engineering & Physics*, vol. 28, no. 8, pp. 842–849, 2006.

[18] Analog Devices, *ADXL345 Data Sheet: Small, Thin, Low Power, 3-Axis* $\pm 16\,g$ *Digital Accelerometer*, https://www.analog.com/media/en/technical-documentation/data-sheets/adxl345.pdf, 2022, rev. G.

[19] InvenSense, *ITG-3200 Product Specification: Single-Chip Three-Axis Digital Output Gyroscope*, https://files.seeedstudio.com/wiki/Grove-3-Axis_Digital_Gyro/res/ITG-3200.pdf, 2011, rev. 1.7.

[20] S. Aburakhia, A. Shami, and G. K. Karagiannidis, "On the intersection of signal processing and machine learning: A use case-driven analysis approach," *arXiv preprint arXiv:2403.17181*, 2024.

[21] A. Dehghani, O. Sarbishei, T. Glatard, and E. Shihab, "A quantitative comparison of overlapping and non-overlapping sliding windows for human activity recognition using inertial sensors," *Sensors*, vol. 19, no. 22, p. 5026, 2019.

[22] H.-Y. Kim, "Statistical notes for clinical researchers: Assessing normal distribution (2) using skewness and kurtosis," *Restorative Dentistry & Endodontics*, vol. 38, no. 1, pp. 52–54, 2013.

[23] S. L. M. Sitio, *Machine Learning Berbasis Pohon Keputusan: Implementasi Decision Tree dan Random Forest di Google Colab*. Cilacap, Jawa Tengah: PT Media Pustaka Indo, 2026. [Online]. Available: https://media.neliti.com/media/publications/669270-machine-learning-berbasis-pohon-keputusa-237caf46.pdf

[24] L. Breiman, "Random forests," *Machine Learning*, vol. 45, no. 1, pp. 5–32, 2001.

[25] J. Manurung, H. Saragih, M. A. Prabukusumo, and E. A. Firdaus, "Optimizing the performance of the k-nearest neighbors algorithm using grid search and feature scaling to improve data classification accuracy," *Jurnal Mandiri IT*, vol. 14, no. 2, pp. 269–280, 2025. [Online]. Available: https://ejournal.isha.or.id/index.php/Mandiri/article/view/466

[26] H. Bhavsar and A. Ganatra, "A comparative study of training algorithms for supervised machine learning," *International Journal of Soft Computing and Engineering*, vol. 2, no. 4, pp. 2231–2307, 2012.

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[27] A. Widodo and B.-S. Yang, "Support vector machine in machine condition monitoring and fault diagnosis," *Mechanical Systems and Signal Processing*, vol. 21, no. 6, pp. 2560–2574, 2007. [Online]. Available: https://www.sciencedirect.com/science/article/pii/S0888327007000027

[28] R. Igual, C. Medrano, and I. Plaza, "Challenges, issues and trends in fall detection systems," *BioMedical Engineering OnLine*, vol. 12, p. 66, 2013.

[29] D. W. Hosmer, S. Lemeshow, and R. X. Sturdivant, *Applied Logistic Regression*, 3rd ed. Hoboken, New Jersey: John Wiley & Sons, 2013.

[30] S. A. Ludwig and K. D. Burnham, "Comparison of euler estimate using extended kalman filter, madgwick and mahony on quadcopter flight data," in *2018 International Conference on Unmanned Aircraft Systems (ICUAS)*, 2018, pp. 1236–1241.

[31] G. Welch and G. Bishop, "An introduction to the kalman filter," *Proc. Siggraph Course*, vol. 8, 01 2006.

[32] G. M. James, D. Witten, T. Hastie, and R. Tibshirani, *An Introduction to Statistical Learning: with Applications in R*, ser. Springer Texts in Statistics. New York: Springer, 2013.

[33] L. Chen, "Curse of dimensionality," in *Encyclopedia of Database Systems*, L. Liu and M. T. Özsu, Eds. Boston, MA: Springer, 2009, pp. 545–546.

[34] N. Kouiroukidis and G. Evangelidis, "The effects of dimensionality curse in high dimensional knn search," in *Proceedings of the 2011 15th Panhellenic Conference on Informatics (PCI)*, 2011, pp. 41–45.

[35] E. Kavuncuoglu, "Comprehensive analysis of feature-algorithm interactions for fall detection across age groups via machine learning," *Computational Intelligence*, vol. 40, no. 5, p. e12697, 2024.