

REFERENCES

- [1] M. M. Islam, G. Lee, and S. N. Hettiwatte, "A review of condition monitoring techniques and diagnostic tests for lifetime estimation of power transformers," *Electrical Engineering*, vol. 100, no. 2, pp. 581–605, Apr. 2017, doi: 10.1007/s00202-017-0532-4.
- [2] H.-C. Sun, Y.-C. Huang, and C.-M. Huang, "A review of dissolved gas analysis in power transformers," *Energy Procedia*, vol. 14, pp. 1220–1225, Jan. 2012, doi: 10.1016/j.egypro.2011.12.1079.
- [3] M. Duval, "A review of faults detectable by gas-in-oil analysis in transformers," *IEEE Electrical Insulation Magazine*, vol. 18, no. 3, pp. 8–17, May 2002, doi: 10.1109/mei.2002.1014963.
- [4] K. Deignan and S. Latifi, "Machine Learning approach to dissolved Gas analysis of power transformers," *International Journal of Computer Applications*, vol. 174, no. 26, pp. 1–5, Mar. 2021, doi: 10.5120/ijca2021921181.
- [5] M. Ukkelberg, "Utilisation of machine learning in power transformer asset management," 2018. [Online]. Available: <https://brage.bibsys.no/xmlui/handle/11250/2559715>.
- [6] O. E. Gouda, S. H. El-Hoshy, and H. H. EL-Tamaly, "Proposed three ratios technique for the interpretation of mineral oil transformers based dissolved gas analysis," *IET Generation Transmission & Distribution*, vol. 12, no. 11, pp. 2650–2661, Mar. 2018, doi: 10.1049/iet-gtd.2017.1927.
- [7] IEC, "Mineral oil-filled electrical equipment in service – Guidance on the interpretation of dissolved and free gases analysis," IEC Standard 60599, Ed. 3.0, Geneva, Switzerland: International Electrotechnical Commission, 2015.
- [8] IEEE Power & Energy Society, "IEEE guide for the interpretation of gases generated in mineral oil-immersed transformers," IEEE Standard C57.104-2019, Piscataway, NJ, USA: IEEE, 2019.
- [9] M. a M. Khan, "AI AND MACHINE LEARNING IN TRANSFORMER FAULT DIAGNOSIS: A SYSTEMATIC REVIEW," *Vol. 1 No. 01 (2025): (April 2025): Innovations in AI, Automation, And Smart Systems*, vol. 1, no. 01, pp. 290–318, Feb. 2025, doi: 10.63125/sxb17553.
- [10] N. Z. Wang, N. Y. Liu, and P. J. Griffin, "A combined ANN and expert system tool for transformer fault diagnosis," *IEEE Transactions on Power Delivery*, vol. 13, no. 4, pp. 1224–1229, Jan. 1998, doi: 10.1109/61.714488.

- [11] S. I. Ibrahim, S. S. M. Ghoneim, and I. B. M. Taha, "DGA Lab: an extensible software implementation for DGA," *IET Generation Transmission & Distribution*, vol. 12, no. 18, pp. 4117–4124, Aug. 2018, doi: 10.1049/iet-gtd.2018.5564.
- [12] M. Duval and A. dePabla, "Interpretation of gas-in-oil analysis using new IEC publication 60599 and IEC TC 10 databases," *IEEE Electrical Insulation Magazine*, vol. 17, no. 2, pp. 31–41, Mar. 2001, doi: 10.1109/57.917529.
- [13] K. Bacha, S. Souahlia, and M. Gossa, "Power transformer fault diagnosis based on dissolved gas analysis by support vector machine," *Electric Power Systems Research*, vol. 83, no. 1, pp. 73–79, Oct. 2011, doi: 10.1016/j.epsr.2011.09.012.
- [14] N. M.-H. Wang, "A novel extension method for transformer fault diagnosis," *IEEE Transactions on Power Delivery*, vol. 18, no. 1, pp. 164–169, Jan. 2003, doi: 10.1109/tpwrd.2002.803838.
- [15] C. Liu and W. Yang, "Transformer fault diagnosis using machine learning: a method combining SHAP feature selection and intelligent optimization of LGBM," *Energy Informatics*, vol. 8, no. 1, Apr. 2025, doi: 10.1186/s42162-025-00519-3.
- [16] P. Sarajcev, D. Jakus, and M. Nikolic, "Wide & Deep Machine Learning Model for Transformer Health Analysis," *2022 7th International Conference on Smart and Sustainable Technologies (SpliTech)*, pp. 1–6, Jun. 2019, doi: 10.23919/splitech.2019.8783122.
- [17] A. Dhini, I. Surjandari, A. Faqih, and B. Kusumoputro, "Intelligent fault diagnosis for power transformer based on DGA data using Support Vector Machine (SVM)," *2018 3rd International Conference on System Reliability and Safety (ICSRS)*, pp. 294–298, Nov. 2018, doi: 10.1109/icsrs.2018.8688719.
- [18] M. K. Ngwenyama and M. N. Gitau, "Discernment of transformer oil stray gassing anomalies using machine learning classification techniques," *Scientific Reports*, vol. 14, no. 1, Jan. 2024, doi: 10.1038/s41598-023-50833-7.
- [19] Y. Zhang *et al.*, "A fault diagnosis model of power transformers based on dissolved gas analysis features selection and improved Krill Herd algorithm optimized support vector 2927018machine," *IEEE Access*, vol. 7, pp. 102803–102811, Jan. 2019, doi: 10.1109/access.2019..
- [20] Y. Li, M.-J. Tang, J.-B. Deng, G.-J. Zhang, and S.-H. Wang, "An approach to aging assessment of power transformer based on multi-parameters," *IEEE International Conference on Condition Monitoring and Diagnosis*, pp. 357–360, Sep. 2012, doi: 10.1109/cmd.2012.6416453.

- [21]I. B. M. Taha, “Power Transformers Health Index Enhancement Based on Convolutional Neural Network after Applying Imbalanced-Data Oversampling,” *Electronics*, vol. 12, no. 11, p. 2405, May 2023, doi: 10.3390/electronics12112405.
- [22] S. S. M. Ghoneim and I. B. M. Taha, “A new approach of DGA interpretation technique for transformer fault diagnosis,” *International Journal of Electrical Power & Energy Systems*, vol. 81, pp. 265–274, Mar. 2016, doi: 10.1016/j.ijepes.2016.02.018.
- [23]M. Duval, “Dissolved gas analysis: It can save your transformer,” *IEEE Electrical Insulation Magazine*, vol. 5, no. 6, pp. 22–27, Nov. 1989, doi: 10.1109/57.44605.
- [24]A. Akbari, A. Setayeshmehr, H. Borsi, and E. Gockenbach, “A software implementation of the Duval triangle method,” *Conference Record of IEEE International Symposium on Electrical Insulation*, Jun. 2008, doi: 10.1109/elinsl.2008.4570294.
- [25]O. E. Gouda and A. Z. E. Dein, “Prediction of aged transformer oil and paper insulation,” *Electric Power Components and Systems*, vol. 47, no. 4–5, pp. 406–419, Mar. 2019, doi: 10.1080/15325008.2019.1604848.