

DAFTAR PUSTAKA

- Agustina, C. (2019) 'Analisa Nasabah Potensial Tabungan Deposito Berjangka Menggunakan Teknik Klasifikasi Data Mining', *Jurnal Teknologi Informasi dan Terapan*, 5(2), pp. 105–112. doi: 10.25047/jtit.v5i2.88.
- Ahmad, A. K., Jafar, A. and Aljoumaa, K. (2019) 'Customer churn prediction in telecom using machine learning in big data platform', *Journal of Big Data*, 6(1). doi: 10.1186/s40537-019-0191-6.
- Alamsyah, A. and Salma, N. (2018) 'A Comparative Study of Employee Churn Prediction Model', *Proceedings - 2018 4th International Conference on Science and Technology, ICST 2018*, 1(2), pp. 1–4. doi: 10.1109/ICSTC.2018.8528586.
- Alzaidi, A. A. (2018) 'Impact of Artificial Intelligence on Performance of Banking Industry in Middle East', *IJCSNS International Journal of Computer Science and Network Security*, 18(10), p. 140. Available at: http://paper.ijcsns.org/07_book/201810/20181021.pdf (Accessed: 28 March 2022).
- Amuda, K. A. and Adeyemo, A. B. (2019) 'Customers Churn Prediction in Financial Institution Using Artificial Neural Network'. Available at: <http://arxiv.org/abs/1912.11346> (Accessed: 2 April 2022).
- Attenberg, J. and Ertekin, Ş. (2013) 'Class imbalance and active learning', *Imbalanced Learning: Foundations, Algorithms, and Applications*, (iii), pp. 101–149. doi: 10.1002/9781118646106.ch6.
- Bagui, S. and Li, K. (2021) 'Resampling imbalanced data for network intrusion detection datasets', *Journal of Big Data*, 8(1). doi: 10.1186/s40537-020-00390-x.
- Bambang Permadi (2020) 'Strategi Nasional Kecerdasan Artifisial Indonesia', p. 194. Available at: <https://ai-innovation.id/server/static/ebook/stranas-ka.pdf> (Accessed: 31 March 2022).
- Bredt, S. (2019) 'Artificial Intelligence (AI) in the Financial Sector—Potential and Public Strategies', *Frontiers in Artificial Intelligence*, 2(October), pp. 1–5. doi: 10.3389/frai.2019.00016.

- De Caigny, A., Coussement, K. and De Bock, K. W. (2018) ‘A new hybrid classification algorithm for customer churn prediction based on logistic regression and decision trees’, *European Journal of Operational Research*, 269(2), pp. 760–772. doi: 10.1016/j.ejor.2018.02.009.
- Charandabi, S. E. (2020) ‘Prediction of Customer Churn in Banking Industry’, (June). Available at: https://www.researchgate.net/profile/Sina-Esmaeilpour-Charandabi-2/publication/342424673_Prediction_of_Customer_Churn_in_Banking_Industry/links/5ef39d534585153fb1b3852b/Prediction-of-Customer-Churn-in-Banking-Industry.pdf (Accessed: 2 April 2022).
- Choirunnisa, S. (2019) ‘Metode Hibrida Oversampling Dan Ketidakseimbangan Data Kegagalan’. Available at: https://repository.its.ac.id/60454/1/05111750010029-Master_Thesis.pdf (Accessed: 7 June 2022).
- Dewi, S. (2019) ‘Komparasi Metode Algoritma Data Mining Pada Prediksi Uji Kelayakan Credit Approval Pada Calon Nasabah Kredit Perbankan’, *Jurnal Khatulistiwa Informatika*, 7(1), pp. 59–65. doi: 10.31294/jki.v7i1.127.
- Dwijo, A. Q. N. E. S. (2014) ‘Pengembangan Iptek Dalam Tinjauan Hukum Islam’. Available at: <https://www.neliti.com/publications/117316/pengembangan-iptek-dalam-tinjauan-hukum-islam> (Accessed: 30 May 2022).
- Fauzi, N. and Chudzaifah, I. (2019) ‘Pandangan dan Kontribusi Islam terhadap Perkembangan Sains’, *AL-FIKR: Jurnal Pendidikan Islam*, 5(1), pp. 1–8. doi: 10.32489/alfikr.v5i1.12.
- Ferreira, F. G. D. C., Gandomi, A. H. and Cardoso, R. T. N. (2021) ‘Artificial Intelligence Applied to Stock Market Trading: A Review’, *IEEE Access*, 9, pp. 30898–30917. doi: 10.1109/ACCESS.2021.3058133.
- Ghaffari, B. and Osman, Y. (2021) ‘Customer churn prediction using machine learning A study in the B2B subscription based service context’, (June). Available at: <https://www.diva-portal.org/smash/get/diva2:1574424/FULLTEXT01.pdf> (Accessed: 29 March 2022).
- Guliyev, H. and Yerdelen, F. (2021) ‘Customer churn analysis in banking sector :

- Evidence from explainable machine learning models’, (2). doi: 10.53753/jame.1.2.03.
- Hamka, P. D. B. (2016) *Tafsir Al-Azhar* 9. Available at: https://drive.google.com/file/d/1iAakpeYPMIvuCrD4JKn0fD_EJZNWLwjI/view?usp=sharing.
- Hayaty, M., Muthmainah, S. and Ghufran, S. M. (2021) ‘Random and Synthetic Over-Sampling Approach to Resolve Data Imbalance in Classification’, *International Journal of Artificial Intelligence Research*, 4(2), p. 86. doi: 10.29099/ijair.v4i2.152.
- He, H., Bai, Y., Garcia, E., & Li, S. (2008) ‘ADASYN: Adaptive synthetic sampling approach for imbalanced learning. In IEEE International Joint Conference on Neural Networks, 2008’, *IJCNN 2008.(IEEE World Congress on Computational Intelligence)* (pp. 1322– 1328), (3), pp. 1322– 1328. Available at: <https://ieeexplore.ieee.org/document/4633969> (Accessed: 6 June 2022).
- Hemalatha, P. and Amalanathan, G. M. (2019) ‘A Hybrid Classification Approach for Customer Churn Prediction using Supervised Learning Methods: Banking Sector’, *Proceedings - International Conference on Vision Towards Emerging Trends in Communication and Networking, ViTECoN 2019*, pp. 1–6. doi: 10.1109/ViTECoN.2019.8899692.
- Herawati, M., Wibowo, I. L. and Mukhlash, I. (2016) ‘Prediksi Customer Churn Menggunakan Algoritma Fuzzy Iterative Dichotomiser 3’, *Limits: Journal of Mathematics and Its Applications*, 13(1), p. 23. doi: 10.12962/j1829605x.v13i1.1913.
- Hermanto, A. (2017) ‘Konsep Maslahat dalam Menyikapi Masalah Kontemporer (Studi Komparatif al-Tûfi dan al-Ghazali)’, *Al-'Adalah*, 14(2), p. 433. doi: 10.24042/adalah.v14i2.2414.
- Husein, A. M. and Harahap, M. (2021) ‘Pendekatan Data Science untuk Menemukan Churn Pelanggan pada Sector Perbankan dengan Machine Learning’, *Data Sciences Indonesia (DSI)*, 1(1), pp. 8–13. doi: 10.47709/dsi.v1i1.1169.
- Hussein, A. S. *et al.* (2019) ‘A-SMOTE: A new preprocessing approach for highly

- imbalanced datasets by improving SMOTE’, *International Journal of Computational Intelligence Systems*, 12(2), pp. 1412–1422. doi: 10.2991/ijcis.d.191114.002.
- Idris HM Noor (2021) ‘Pemanfaatan Ilmu Pengetahuan dan Teknologi Dalam Kegiatan Pengabdian Masyarakat di Perguruan Tinggi’, *Jurnal Pendidikan Kebudayaan*, 17, p. 3. Available at: <https://media.neliti.com/media/publications/139029-none-5bc6e332.pdf> (Accessed: 30 May 2022).
- Iryani, E. (2017) ‘Al- Qur’an Dan Ilmu Pengetahuan Eva Iryani 1’, *Jurnal Ilmiah Universitas Batanghari Jambi*, 17(3), p. 70. Available at: <http://ji.unbari.ac.id/index.php/ilmiah/article/view/403> (Accessed: 30 May 2022).
- Jagwani, G. (2019) ‘Identifying the Patients at Risk of Stroke Using Anomaly Detection Based Classification Approach’. Available at: <http://norma.ncirl.ie/4289/> (Accessed: 6 June 2022).
- Jaya, D. H. *et al.* (2011) *Kecerdasan Buatan, Journal of Physics A: Mathematical and Theoretical*. doi: 10.1088/1751-8113/44/8/085201.
- Karvana, K. G. M. *et al.* (2019) ‘Customer Churn Analysis and Prediction Using Data Mining Models in Banking Industry’, *2019 International Workshop on Big Data and Information Security, IW BIS 2019*, pp. 33–38. doi: 10.1109/IWBIS.2019.8935884.
- Kasztelnik, K. (2021) ‘Innovative Empirical Model for Predicting National Banks’ Financial Failure with Artificial Intelligence Subset Data Analysis in the United States’, *SSRN Electronic Journal*, pp. 98–111. doi: 10.2139/ssrn.3852301.
- Kaur, I. and Kaur, J. (2020) ‘Customer churn analysis and prediction in banking industry using machine learning’, *PDGC 2020 - 2020 6th International Conference on Parallel, Distributed and Grid Computing*, pp. 434–437. doi: 10.1109/PDGC50313.2020.9315761.
- V. Kavitha *et al.* (2020) ‘Churn Prediction of Customer in Telecom Industry using Machine Learning Algorithms’, *International Journal of Engineering Research and*, V9(05), pp. 181–184. doi: 10.17577/ijertv9is050022.

- Kementerian Agama Republik Indonesia (2019) 'Al-Qur'an dan Terjemahannya'. Jakarta: Kementerian Agama Republik Indonesia.
- Kumar, G. R., Tirupathaiah, K. and Reddy, B. K. (2019) 'Client Churn Prediction of Banking and fund industry utilizing Machine Learning Techniques', *International Journal of Computer Sciences and Engineering*, 7(6), pp. 842–846. doi: 10.26438/ijcse/v7i6.842846.
- Le, T. *et al.* (2018) 'Oversampling techniques for bankruptcy prediction: Novel features from a transaction dataset', *Symmetry*, 10(4). doi: 10.3390/sym10040079.
- Mehrotra, A. (2019) 'Artificial Intelligence in Financial Services - Need to Blend Automation with Human Touch', *2019 International Conference on Automation, Computational and Technology Management, ICACTM 2019*, pp. 342–347. doi: 10.1109/ICACTM.2019.8776741.
- Méndez-Suárez, M., García-Fernández, F. and Gallardo, F. (2019) 'Artificial intelligence modelling framework for financial automated advising in the copper market', *Journal of Open Innovation: Technology, Market, and Complexity*, 5(4). doi: 10.3390/joitmc5040081.
- Mishra, K. and Rani, R. (2018) 'Churn prediction in telecommunication using machine learning', *2017 International Conference on Energy, Communication, Data Analytics and Soft Computing, ICECDS 2017*, (2012), pp. 2252–2257. doi: 10.1109/ICECDS.2017.8389853.
- Mohammad, N. I. *et al.* (2019) 'Customer Churn Prediction in Telecommunication Industry Using Machine Learning Classifiers', *ACM International Conference Proceeding Series*. doi: 10.1145/3387168.3387219.
- Nalatissifa, H. and Pardede, H. F. (2021) 'Customer Decision Prediction Using Deep Neural Network on Telco Customer Churn Data', *Jurnal Elektronika dan Telekomunikasi*, 21(2), p. 122. doi: 10.14203/jet.v21.122-127.
- Nata, A. (2018) *Islam dan Ilmu Pengetahuan*. PRENADAMEDIA GROUP. Available at: <https://books.google.co.id/books?hl=en&lr=&id=IpNeDwAAQBAJ&oi=fnd&pg=P>

A1&dq=ilmu+pengetahuan+adalah+pengetahuan&ots=FF7kPMefAW&sig=wcmj
HKbpIEzG5kp-jX531CIHj5Y&redir_esc=y#v=onepage&q=ilmu pengetahuan
adalah pengetahuan&f=false.

- Nguyen, N. N. and Duong, A. T. (2021) 'Comparison of two main approaches for handling imbalanced data in churn prediction problem', *Journal of Advances in Information Technology*, 12(1), pp. 29–35. doi: 10.12720/jait.12.1.29-35.
- Oladunjoye, M. (2021) 'A Comprehensive Analysis of Handling Imbalanced Dataset', *International Journal of Advanced Trends in Computer Science and Engineering*, 10(2), pp. 454–463. doi: 10.30534/ijatcse/2021/031022021.
- Olaniyi, A. S. *et al.* (2020) 'Customer Churn Prediction in Banking Industry Using K-Means and Support Vector Machine Algorithms', *International Journal of Multidisciplinary Sciences and Advanced Technology*, 1(1), pp. 48–54. Available at: https://www.researchgate.net/profile/Micheal-Arowolo/publication/346910130_Customer_Churn_Prediction_in_Banking_Industry_Using_K-Means_and_Support_Vector_Machine_Algorithms/links/5fd1f34da6fdcc697bf30d22/Customer-Churn-Prediction-in-Banking-Industry-Using (Accessed: 29 March 2022).
- Patwary, M. J. A. *et al.* (2021) 'Bank Deposit Prediction Using Ensemble Learning', *Artificial Intelligence Evolution*, pp. 42–51. doi: 10.37256/aie.222021880.
- Peranginangin, R. *et al.* (2020) 'Penerapan Algoritma Safe-Level-Smote Untuk Peningkatan Nilai G-Mean Dalam Klasifikasi Data Tidak Seimbang', *METHOMIKA Jurnal Manajemen Informatika dan Komputerisasi Akuntansi*, 4(1), pp. 67–72. doi: 10.46880/jmika.vol4no1.pp67-72.
- Petrelli, D. and Cesarini, F. (2021) 'Artificial intelligence methods applied to financial assets price forecasting in trading contexts with low (intraday) and very low (high-frequency) time frames', *Strategic Change*, 30(3), pp. 247–256. doi: 10.1002/jsc.2407.
- Plaksij, Z. (2021) *Customer Churn: 12 Ways to Stop Churn Immediately, Super Office*. Available at: <https://www.superoffice.com/blog/reduce-customer-churn/> (Accessed:

12 April 2022).

- Pruengkarn, R., Wong, K. W. and Fung, C. C. (2017) 'Imbalanced data classification using complementary fuzzy support vector machine techniques and SMOTE', *2017 IEEE International Conference on Systems, Man, and Cybernetics, SMC 2017*, 2017-Janua, pp. 978–983. doi: 10.1109/SMC.2017.8122737.
- Qomah, N. S. (2021) 'Klasifikasi Pengelolaan Kredit Menggunakan Metode Naïve Bayes', 1(1), pp. 16–20. Available at: <http://publikasi.bigdatascience.id/index.php/jdsi/article/view/19> (Accessed: 29 March 2022).
- Rahayu, S., Bharata Adji, T. and Akhmad Setiawan, N. (2017) 'Penghitungan k-NN pada Adaptive Synthetic-Nominal (ADASYN-N) dan Adaptive Synthetic-kNN (ADASYN-kNN) untuk Data Nominal-Multi Kategori', *Jurnal Otomasi Kontrol dan Instrumentasi*, 9(2), p. 119. doi: 10.5614/joki.2017.9.2.5.
- Rahayu, W. P. *et al.* (2021) 'THE ROLE OF DIGITAL MARKETING, INNOVATION, SELF-EFFICACY IN BUSINESS SUSTAINABILITY AT THE RENGGINANG INDUSTRIAL CENTRE IN THE NEW NORMAL', 24(6), pp. 88–95. Available at: 02 Apri 2022 (Accessed: 3 April 2022).
- Rahman, M. and Kumar, V. (2020) 'Machine Learning Based Customer Churn Prediction in Banking', *Proceedings of the 4th International Conference on Electronics, Communication and Aerospace Technology, ICECA 2020*, pp. 1196–1201. doi: 10.1109/ICECA49313.2020.9297529.
- Ramadhanti, N. S., Kusuma, W. A. and Annisa, A. (2020) 'Optimasi Data Tidak Seimbang pada Interaksi Drug Target dengan Sampling dan Ensemble Support Vector Machine', *Jurnal Teknologi Informasi dan Ilmu Komputer*, 7(6), p. 1221. doi: 10.25126/jtiik.2020762857.
- Roihan, A., Sunarya, P. A. and Rafika, A. S. (2020) 'Pemanfaatan Machine Learning dalam Berbagai Bidang: Review paper', *IJCIT (Indonesian Journal on Computer and Information Technology)*, 5(1), pp. 75–82. doi: 10.31294/ijcit.v5i1.7951.
- Saifudin, A. *et al.* (2015) 'Pendekatan Level Data untuk Menangani Ketidakseimbangan

- Kelas pada Prediksi Cacat Software’, *Journal of Software Engineering*, 1(2), pp. 76–85. Available at: <https://media.neliti.com/media/publications/90201-ID-pendekatan-level-data-untuk-menangani-ke.pdf> (Accessed: 7 June 2022).
- Santharam, A. and Krishnan, S. B. (2018) ‘IRJET- SURVEY ON CUSTOMER CHURN PREDICTION TECHNIQUES’. Available at: <https://www.academia.edu/download/57942039/IRJET-V5I1126.pdf> (Accessed: 23 April 2022).
- Shamsudin, H. *et al.* (2020) ‘Combining oversampling and undersampling techniques for imbalanced classification: A comparative study using credit card fraudulent transaction dataset’, *IEEE International Conference on Control and Automation, ICCA*, 2020-Octob, pp. 803–808. doi: 10.1109/ICCA51439.2020.9264517.
- Sharafi, A. *et al.* (2016) ‘Financial management of Public Private Partnership projects using artificial intelligence and fuzzy model’, *International Journal of Energy and Statistics*, 04(02), p. 1650007. doi: 10.1142/s2335680416500071.
- Shirgave, S. K. *et al.* (2019) ‘A review on credit card fraud detection using machine learning’, *International Journal of Scientific and Technology Research*, 8(10), pp. 1217–1220. Available at: https://www.researchgate.net/publication/336552027_A_Review_On_Credit_Card_Fraud_Detection_Using_Machine_Learning (Accessed: 28 March 2022).
- Siringoringo, R. (2018) ‘Klasifikasi Data Tidak Seimbang Menggunakan Algoritma SMOTE dan k-Nearest Neighbor’, *Jurnal ISD*, 3(1), pp. 44–49. Available at: <https://ejournal-medan.uph.edu/index.php/isd/article/viewFile/177/63> (Accessed: 6 July 2022).
- Sivasankar, E. and Vijaya, J. (2019) ‘Hybrid PPFCM-ANN model: an efficient system for customer churn prediction through probabilistic possibilistic fuzzy clustering and artificial neural network’, *Neural Computing and Applications*, 31(11), pp. 7181–7200. doi: 10.1007/s00521-018-3548-4.
- Suhendra, T. and Cs, M. (2021) ‘Makalah Pembelajaran Mesin (Machine Learning) Dosen Pengampu’, *Makalah Pembelajaran Mesin (machine learning)*. Available at: <https://osf.io/preprints/jy72s/> (Accessed: 30 March 2022).

- Tran, T. C. and Dang, T. K. (2021) ‘Machine Learning for Prediction of Imbalanced Data: Credit Fraud Detection’, *Proceedings of the 2021 15th International Conference on Ubiquitous Information Management and Communication, IMCOM 2021*, (MI). doi: 10.1109/IMCOM51814.2021.9377352.
- Ullah, I., Raza, B., *et al.* (2019) ‘A Churn Prediction Model Using Random Forest: Analysis of Machine Learning Techniques for Churn Prediction and Factor Identification in Telecom Sector’, *IEEE Access*, 7, pp. 60134–60149. doi: 10.1109/ACCESS.2019.2914999.
- Ullah, I., Ali, I., *et al.* (2019) ‘Churn Prediction in Banking System using K-’, *2019 International Conference on Electrical, Communication, and Computer Engineering (ICECCE)*, (July), pp. 1–6. Available at: <https://ieeexplore.ieee.org/document/8940667> (Accessed: 29 March 2022).
- Vikaliana, R. (2017) ‘Faktor-Faktor Risiko Dalam Perusahaan’, 01(April). Available at: <https://ojs.stiami.ac.id/index.php/logistik/article/view/128/113> (Accessed: 30 May 2022).
- Wadikar, D. (2020) ‘Prediksi Churn Pelanggan Deepshikha Wadikar’. doi: 10.21427/kpsz-x829.
- Wertz, J. (2018) *Don't Spend 5 Times More Attracting New Customers, Nurture The Existing Ones*, *Forbes*. Available at: <https://www.forbes.com/sites/jiawertz/2018/09/12/dont-spend-5-times-more-attracting-new-customers-nurture-the-existing-ones/?sh=6a7d65dc5a8e> (Accessed: 2 April 2022).
- Zhang, F. *et al.* (2019) ‘GMM-based Undersampling and Its Application for Credit Card Fraud Detection’, *Proceedings of the International Joint Conference on Neural Networks*, 2019-July(July), pp. 1–8. doi: 10.1109/IJCNN.2019.8852415.