

## DAFTAR PUSTAKA

- Aggarwal, C. C. (2018). *Neural Networks and Deep Learning*. Springer International Publishing. <https://doi.org/10.1007/978-3-319-94463-0>
- Alessandrini, L., Romani, S., Pinnavaia, G., & Rosa, M. D. (2008). Near infrared spectroscopy: An analytical tool to predict coffee roasting degree. *Analytica Chimica Acta*, 625(1), 95–102. <https://doi.org/10.1016/j.aca.2008.07.013>
- Arboleda, E. R., Fajardo, A. C., & Medina, R. P. (2018). Classification of coffee bean species using image processing, artificial neural network and K nearest neighbors. *2018 IEEE International Conference on Innovative Research and Development, ICIRD 2018, May*, 1–5. <https://doi.org/10.1109/ICIRD.2018.8376326>
- Ayu, P. C., Budiastara, I. W., & Rindang, A. (2020). NIR spectroscopy application for determination caffeine content of Arabica green bean coffee. *IOP Conference Series: Earth and Environmental Science*, 454(1), 2–6. <https://doi.org/10.1088/1755-1315/454/1/012049>
- Azami, H., Mohammadi, K., & Bozorgtabar, B. (2012). An Improved Signal Segmentation Using Moving Average and Savitzky-Golay Filter. *Journal of Signal and Information Processing*, 03(01), 39–44. <https://doi.org/10.4236/jsip.2012.31006>
- Balduzzi, D., Frean, M., Leary, L., Lewis, J., Wan-Duo Ma, K., & McWilliams, B. (2017). The Shattered Gradients Problem: If resnets are the answer, then what is the question? *Proceedings of the 34th International Conference on Machine Learning*, 342–350.
- Ballabio, D., & Todeschini, R. (2009). *Chapter 4 - Multivariate Classification for Qualitative Analysis* (D.-W. B. T.-I. S. for F. Q. A. and C. Sun (ed.); pp. 83–104). Academic Press. <https://doi.org/10.1016/B978-0-12-374136-3.00004-3>
- Baqueta, M. R., Coqueiro, A., & Patricia, V. (2019). Brazilian Coffee Blends: A Simple and Fast Method by Near-Infrared Spectroscopy for the Determination of the Sensory Attributes Elicited in Professional Coffee Cupping. *Journal of Food Science*, 0(0). <https://doi.org/10.1111/1750-3841.14617>
- Barbin, D. F., Felicio, A. L. de S. M., Sun, D. W., Nixdorf, S. L., & Hirooka, E. Y. (2014). Application of infrared spectral techniques on quality and compositional attributes of coffee: An overview. *Food Research International*, 61, 23–32. <https://doi.org/10.1016/j.foodres.2014.01.005>
- Bedaso, M., Meshesha, M., & Diriba, C. (2022). Grading Ethiopian Coffee Raw Quality Using Image Processing Techniques. *Research Square*. <https://doi.org/10.21203/rs.3.rs-1980632/v1>
- Bowers, A. J., & Zhou, X. (2019). Receiver Operating Characteristic (ROC) Area Under the Curve (AUC): A Diagnostic Measure for Evaluating the Accuracy of Predictors of Education Outcomes. *Journal of Education for Students Placed at Risk*, 24(1), 20–46. <https://doi.org/10.1080/10824669.2018.1523734>
- Brereton, R. G. (2009). Chemometrics for Pattern Recognition. In *Chemometrics for Pattern Recognition*. John Wiley & Sons, Ltd. <https://doi.org/10.1002/9780470746462>
- Briandet, R., Kemsley, E. K., & Wilson, R. H. (1996). Approaches to adulteration detection

- in instant coffees using infrared spectroscopy and chemometrics. *Journal of the Science of Food and Agriculture*, 71(3), 359–366. [https://doi.org/10.1002/\(sici\)1097-0010\(199607\)71:3<359::aid-jsfa593>3.0.co;2-d](https://doi.org/10.1002/(sici)1097-0010(199607)71:3<359::aid-jsfa593>3.0.co;2-d)
- Budiastra, I. W., Sutrisno, S., Widyotomo, S., & Ayu, P. C. (2018). Prediction of Caffeine Content in Java Preanger Coffee Beans by NIR Spectroscopy Using PLS and MLR Method. *IOP Conference Series: Earth and Environmental Science*, 147(1). <https://doi.org/10.1088/1755-1315/147/1/012004>
- Campos, G. F. C., Mastelini, S. M., Aguiar, G. J., Mantovani, R. G., Melo, L. F. de, & Barbon, S. (2019). Machine learning hyperparameter selection for Contrast Limited Adaptive Histogram Equalization. *Eurasip Journal on Image and Video Processing*, 2019(1). <https://doi.org/10.1186/s13640-019-0445-4>
- Carrington, A. M., Manuel, D. G., Fieguth, P., Ramsay, T. O., Osmani, V., Wernly, B., Bennett, C., Hawken, S., Magwood, O., Sheikh, Y., Mcinnes, M., & Holzinger, A. (2022). Deep ROC Analysis and AUC as Balanced Average Accuracy, for Improved Classifier Selection, Audit and Explanation. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 45(1), 329–341. <https://doi.org/10.1109/TPAMI.2022.3145392>
- Chakravartula, S. S. N., Moscetti, R., Bedini, G., Nardella, M., & Massantini, R. (2022). Use of convolutional neural network (CNN) combined with FT-NIR spectroscopy to predict food adulteration: A case study on coffee. *Food Control*, 135(January), 108816. <https://doi.org/10.1016/j.foodcont.2022.108816>
- Chen, H., Song, Q., Tang, G., Feng, Q., & Lin, L. (2013). The Combined Optimization of Savitzky-Golay Smoothing and Multiplicative Scatter Correction for FT-NIR PLS Models. *ISRN Spectroscopy*, 2013, 1–9. <https://doi.org/10.1155/2013/642190>
- Cheng, H. D., Jiang, X. H., Sun, Y., & Wang, J. (2001). Color image segmentation: Advances and prospects. *Pattern Recognition*, 34(12), 2259–2281. [https://doi.org/10.1016/S0031-3203\(00\)00149-7](https://doi.org/10.1016/S0031-3203(00)00149-7)
- Chityala, R., & Pudipeddi, S. (2014). *Image Processing and Acquisition using Python*. Taylor & Francis Group, LLC.
- Correia, R. M., Tosato, F., Domingos, E., Rodrigues, R. R. T., Aquino, L. F. M., Filgueiras, P. R., Lacerda, V., & Romão, W. (2018). Portable near infrared spectroscopy applied to quality control of Brazilian coffee. *Talanta*, 176(April 2017), 59–68. <https://doi.org/10.1016/j.talanta.2017.08.009>
- Craig, A. P., Franca, A. S., & Oliveira, L. S. (2012). Discrimination between defective and non-defective roasted coffees by diffuse reflectance infrared Fourier transform spectroscopy. *Lwt*, 47(2), 505–511. <https://doi.org/10.1016/j.lwt.2012.02.016>
- Dani, Tresniawati, C., & Randriani, E. (2013). Seleksi Genotipe Unggul Kopi Robusta Spesifik Lokasi. *Seleksi Genotipe Unggul Kopi Robusta Spesifik Lokasi*, 4(2), 139–144.
- Dawson-Howe, K. (2014). *A Practical Introduction to Computer Vision with OpenCV*. John Wiley & Sons, Ltd. [http://www.amazon.com/Practical-Introduction-Computer-Imaging-Technology/dp/1118848454/ref=sr\\_1\\_6?s=books&ie=UTF8&qid=1415059357&sr=1-6&keywords=openvcv](http://www.amazon.com/Practical-Introduction-Computer-Imaging-Technology/dp/1118848454/ref=sr_1_6?s=books&ie=UTF8&qid=1415059357&sr=1-6&keywords=openvcv)
- de Almeida, V. E., de Sousa Fernandes, D. D., Diniz, P. H. G. D., de Araújo Gomes, A.,

- Véras, G., Galvão, R. K. H., & Araujo, M. C. U. (2021). Scores selection via Fisher's discriminant power in PCA-LDA to improve the classification of food data. *Food Chemistry*, 363(March). <https://doi.org/10.1016/j.foodchem.2021.130296>
- De Oliveira, E. M., Leme, D. S., Barbosa, B. H. G., Rodarte, M. P., & Alvarenga Pereira, R. G. F. (2016). A computer vision system for coffee beans classification based on computational intelligence techniques. *Journal of Food Engineering*, 171, 22–27. <https://doi.org/10.1016/j.jfoodeng.2015.10.009>
- Desmiaty, Y., Nurhidayati, L., Made Dwi Sandhiutami, N., Muhammad Ramdhan Hasan, R., Adella Meynderth, K., & Ayu Noviasuti, D. (2022). The Characteristics of Some Commercial Arabica Coffee Beans in Indonesia (Karakteristik Beberapa Biji Kopi Arabika Komersil di Indonesia). *Jurnal Ilmu Kefarmasian Indonesia*, 20(2), 245–251.
- Du, C. J., & Sun, D. W. (2004). Recent developments in the applications of image processing techniques for food quality evaluation. *Trends in Food Science and Technology*, 15(5), 230–249. <https://doi.org/10.1016/j.tifs.2003.10.006>
- Farhaty, N. (2016). Tinjauan Kimia Dan Aspek Farmakologi Senyawa Asam Klorogenat Pada Biji Kopi : Review. *Farmaka Jurnal Ilmiah Farmasi Indonesia*, 14(1), 214–227.
- García, M., Candelo-Becerra, J. E., & Hoyos, F. E. (2019). Quality and defect inspection of green coffee beans using a computer vision system. *Applied Sciences (Switzerland)*, 9(19). <https://doi.org/10.3390/app9194195>
- Gebejes, A., & Huertas, R. (2013). Texture Characterization based on Grey-Level Co-occurrence Matrix. *Conference of Informatics and Management Sciences*, 375–378.
- Géron, A. (2019). Hands-on Machine Learning with Scikit-Learning, Keras and Tensorflow. In *O'Reilly Media, Inc.*
- Giraud, A., Grassi, S., Savorani, F., Gavoci, G., Casiraghi, E., & Geobaldo, F. (2018). Determination of the geographical origin of green coffee beans using NIR spectroscopy and multivariate data analysis. *Food Control*, 99(2019), 137–145. <https://doi.org/10.1016/j.foodcont.2018.12.033>
- Giraud, A., Grassi, S., Savorani, F., Gavoci, G., Casiraghi, E., & Geobaldo, F. (2019). *Determination of the geographical origin of green coffee beans using NIR spectroscopy and multivariate data analysis*. 99(December 2018), 137–145.
- Glorot, X., & Bengio, Y. (2010). Understanding the difficulty of training deep feedforward neural networks. *Journal of Machine Learning Research*, 9, 249–256.
- Gonzalez, R. C., & Woods, R. E. (2018). *Digital Image Processing* (4th ed.). Pearson Education Limited.
- Gordillo-Delgado, F., Bedoya, A., & Marín, E. (2017). Study of the Pigments in Colombian Powdered Coffee Using Photoacoustic Spectroscopy. *International Journal of Thermophysics*, 38(1), 1–8. <https://doi.org/10.1007/s10765-016-2144-z>
- Guiñón, J. L., Ortega, E., García-Antón, J., & Pérez-herranz, V. (2007). Moving Average and Savitzki-Golay Smoothing Filters Using Mathcad. *International Conference on Engineering Education*, 1, 1–4. <http://academic.research.microsoft.com/Paper/12119855.aspx>
- Hall, R. D., Trevisan, F., & Vos, R. C. H. De. (2022). Coffee berry and green bean chemistry – Opportunities for improving cup quality and crop circularity. *Food Research*

- International*, 151(May 2021), 110825. <https://doi.org/10.1016/j.foodres.2021.110825>
- Haralick, R. M., Shanmugam, K., & Dinstein, I. (1973). Textural Features for Image Classification. *IEEE Transactions on Systems, Man and Cybernetics*, 3(6), 610–621.
- He, K., Zhang, X., Ren, S., & Su, J. (2014). Delving Deep into Rectifiers: Surpassing Human-Level Performance on ImageNet Classification. *Proceedings of the IEEE International Conference on Computer Vision*, 1026–1034.
- He, Y., Feng, S., Deng, X., & Li, X. (2006). Study on lossless discrimination of varieties of yogurt using the Visible/NIR-spectroscopy. *Food Research International*, 39(6), 645–650. <https://doi.org/10.1016/j.foodres.2005.12.008>
- He, Y., Li, X., & Deng, X. (2007). Discrimination of varieties of tea using near infrared spectroscopy by principal component analysis and BP model. *Journal of Food Engineering*, 79(4), 1238–1242. <https://doi.org/10.1016/j.jfoodeng.2006.04.042>
- Heaton, J. (2008). *Introduction to Neural Networks for Java, Second Edition*. Heaton Research, Inc.
- Holden, N. M., Wolfe, M. L., Ogejo, J. A., & Cummins, E. J. (2020). *Biosystems Engineering*. ASABE.
- Huck, C. W., Guggenbichler, W., & Bonn, G. K. (2005). Analysis of caffeine, theobromine and theophylline in coffee by near infrared spectroscopy (NIRS) compared to high-performance liquid chromatography (HPLC) coupled to mass spectrometry. *Analytica Chimica Acta*, 538(1–2), 195–203. <https://doi.org/10.1016/j.aca.2005.01.064>
- Humeau-heurtier, A. (2019). Texture Feature Extraction Methods : A Survey. *IEEE Access*, 7, 8975–9000. <https://doi.org/10.1109/ACCESS.2018.2890743>
- Ihsan, B. R. P., Shalas, A. F., Y., E., L.M., C., & Putri, A. R. (2023). Determination of caffeine in Robusta coffee beans with different roasting method using UV-Vis spectrophotometry. *Food Research*, 7(6), 29–34. [https://doi.org/10.26656/fr.2017.7\(6\).1006](https://doi.org/10.26656/fr.2017.7(6).1006)
- Ji, S., & Ye, J. (2009). Linear dimensionality reduction for multi-label classification. *IJCAI International Joint Conference on Artificial Intelligence*, 1077–1082.
- Jia, W., Zhao, D., Shen, T., Ding, S., Zhao, Y., & Hu, C. (2015). An optimized classification algorithm by BP neural network based on PLS and HCA. *Applied Intelligence*, 43(1), 176–191. <https://doi.org/10.1007/s10489-014-0618-x>
- Johnson, R. A., & Wichern, D. W. (2014). *Applied Multivariate Statistical Analysis, 6th edition*. Pearson Education Limited.
- Keen, N. (2005). *Color Moments*.
- Keller, J. M., & Gray, M. R. (1985). A Fuzzy K-Nearest Neighbor Algorithm. *IEEE Transactions on Systems, Man and Cybernetics*, SMC-15(4), 580–585. <https://doi.org/10.1109/TSMC.1985.6313426>
- Kemsley, E. K., Ruault, S., & Wilson, R. H. (1995). Discrimination between Coffea arabica and Coffea canephora variant robusta beans using infrared spectroscopy. *Food Chemistry*, 54(3), 321–326. [https://doi.org/10.1016/0308-8146\(95\)00030-M](https://doi.org/10.1016/0308-8146(95)00030-M)
- Ketkar, N., & Moolayil, J. (2021). Deep Learning with Python: Learn Best Practices of Deep

- Learning Models with PyTorch, 2nd Edition. In *First*.
- Khoshroo, A., Arefi, A., Masoumiasl, A., & Jowkar, G.-H. (2014). Classification of Wheat Cultivars Using Image Processing and Artificial Neural Networks . *Academia*, 2(1), 17–22.
- Kiliç, K., Boyaci, I. H., Köksel, H., & Küsmenoglu, I. (2007). A classification system for beans using computer vision system and artificial neural networks. *Journal of Food Engineering*, 78(3), 897–904. <https://doi.org/10.1016/j.jfoodeng.2005.11.030>
- Kingma, D. P., & Ba, J. L. (2015). Adam: A method for stochastic optimization. *3rd International Conference on Learning Representations, ICLR 2015 - Conference Track Proceedings*, 1–15.
- Koklu, M., Cinar, I., & Taspinar, Y. S. (2021). Classification of rice varieties with deep learning methods. *Computers and Electronics in Agriculture*, 187(November 2020), 106285. <https://doi.org/10.1016/j.compag.2021.106285>
- Koklu, M., & Ozkan, I. A. (2020). Multiclass classification of dry beans using computer vision and machine learning techniques. *Computers and Electronics in Agriculture*, 174(June 2019), 105507. <https://doi.org/10.1016/j.compag.2020.105507>
- Kulkarni, A., Chong, D., & Batarseh, F. A. (2020). 5 - *Foundations of data imbalance and solutions for a data democracy* (F. A. Batarseh & R. B. T.-D. D. Yang (eds.)); pp. 83–106). Academic Press. <https://doi.org/10.1016/B978-0-12-818366-3.00005-8>
- Kurniawan, F., Budiastira, I. W., Sutrisno, & Widiotomo, S. (2019). Classification of arabica Java coffee beans based on their origin using nir spectroscopy. *IOP Conference Series: Earth and Environmental Science*, 309(1), 0–8. <https://doi.org/10.1088/1755-1315/309/1/012006>
- Larkin, P. J. (2011). *Infrared and Raman Spectroscopy: Principles and Spectral Interpretation*. Elsevier Inc.
- Liakos, K. G., Busato, P., Moshou, D., Pearson, S., & Bochtis, D. (2018). Machine learning in agriculture: A review. *Sensors*, 18(8), 1–29. <https://doi.org/10.3390/s18082674>
- Lopes, J. F., Ludwig, L., Barbin, D. F., Grossmann, M. V. E., & Barbon, S. (2019). Computer vision classification of barley flour based on spatial pyramid partition ensemble. *Sensors (Switzerland)*, 19(13), 1–17. <https://doi.org/10.3390/s19132953>
- Ma, J., Sun, D. W., Qu, J. H., Liu, D., Pu, H., Gao, W. H., & Zeng, X. A. (2016). Applications of Computer Vision for Assessing Quality of Agri-food Products: A Review of Recent Research Advances. *Critical Reviews in Food Science and Nutrition*, 56(1), 113–127. <https://doi.org/10.1080/10408398.2013.873885>
- Majnik, M., & Bosnić, Z. (2013). ROC analysis of classifiers in machine learning: A survey. *Intelligent Data Analysis*, 17(3), 531–558. <https://doi.org/10.3233/IDA-130592>
- Marquetti, I., Link, J. V., Lemes, A. L. G., Scholz, M. B. dos S., Valderrama, P., & Bona, E. (2016). Partial least square with discriminant analysis and near infrared spectroscopy for evaluation of geographic and genotypic origin of arabica coffee. *Computers and Electronics in Agriculture*, 121, 313–319. <https://doi.org/10.1016/j.compag.2015.12.018>
- Marsilani, O. N., Wagiman, & Sukartiko, A. C. (2020). Chemical profiling of western Indonesian single origin robusta coffee. *IOP Conference Series: Earth and*

- Environmental Science*, 425(1). <https://doi.org/10.1088/1755-1315/425/1/012041>
- Martins, V. D. C., Godoy, R. L. D. O., Gouveâ, A. C. M. S., Santiago, M. C. P. D. A., Borguini, R. G., Braga, E. C. D. O., Pacheco, S., & Nascimento, L. D. S. D. M. Do. (2018). Fraud investigation in commercial coffee by chromatography. *Food Quality and Safety*, 2(3), 121–133. <https://doi.org/10.1093/fqsafe/fyy017>
- Meenu, M., Kurade, C., Neelapu, B. C., Kalra, S., Ramaswamy, H. S., & Yu, Y. (2021). A concise review on food quality assessment using digital image processing. *Trends in Food Science and Technology*, 118(PA), 106–124. <https://doi.org/10.1016/j.tifs.2021.09.014>
- Mehmood, T., Liland, K. H., Snipen, L., & Sæbø, S. (2012). A review of variable selection methods in Partial Least Squares Regression. *Chemometrics and Intelligent Laboratory Systems*, 118, 62–69. <https://doi.org/10.1016/j.chemolab.2012.07.010>
- Miller, J. N., & Miller, J. C. (2010). *Statistics and Chemometrics for Analytical Chemistry*. Pearson Education Limited. <https://doi.org/10.1198/tech.2004.s248>
- Naes, T., Isaksson, T., Fearn, T., & Davies, T. (2002). *A User-Friendly Guide to Multivariate Calibration and Classification*. NIR Publications.
- Nasution, T. H., & Andayani, U. (2017). Recognition of Roasted Coffee Bean Levels using Image Processing and Neural Network. *IOP Conference Series: Materials Science and Engineering PAPER*, 180(012059). <https://doi.org/10.1088/1742-6596/755/1/011001>
- Nicolai, B. M., Beullens, K., Bobelyn, E., Peirs, A., Saeys, W., Theron, K. I., & Lammertyn, J. (2007). Nondestructive measurement of fruit and vegetable quality by means of NIR spectroscopy: A review. *Postharvest Biology and Technology*, 46(2), 99–118. <https://doi.org/10.1016/j.postharvbio.2007.06.024>
- Nugraha, D. A., & Wiguna, A. S. (2020). Seleksi Fitur Warna Citra Digital Biji Kopi Menggunakan Metode Principal Component Analysis. *RESEARCH: Computer, Information System & Technology Management*, 3(1), 24. <https://doi.org/10.25273/research.v3i1.5352>
- Oliveira, M. M., Cerqueira, B. V., Barbon, S., & Barbin, D. F. (2021). Classification of fermented cocoa beans (cut test) using computer vision. *Journal of Food Composition and Analysis*, 97(November 2020), 103771. <https://doi.org/10.1016/j.jfca.2020.103771>
- Osborne, B. G. (2006). Near-Infrared Spectroscopy in Food Analysis. *Encyclopedia of Analytical Chemistry*, 1–14. <https://doi.org/10.1002/9780470027318.a1018>
- Patil, J. K. (2011). Color Feature Extraction of Tomato Leaf Diseases. *International Journal of Engineering Trends and Technology*, 2(2), 72–74.
- Patro, S. G. K., & sahu, K. K. (2015). Normalization: A Preprocessing Stage. *Iarjset*, 2(3), 20–22. <https://doi.org/10.17148/iarjset.2015.2305>
- Pavia, D. L., Lampman, G. M., Kriz, G. S., & Vyvyan, J. R. (2015). *Introduction to Spectroscopy* (5th ed.). Cengage Learning.
- Pazoki, A. R., Farokhi, F., & Pazoki, Z. (2014). Classification of rice grain varieties using two artificial neural networks (mlp and neuro-fuzzy). *Journal of Animal and Plant Sciences*, 24(1), 336–343.
- Preedy, V. R. (2015). *Coffee in Health and Disease Prevention*. Elsevier Inc.

- Ramchoun, H., Amine, M., Idrissi, J., Ghanou, Y., & Ettaouil, M. (2016). Multilayer Perceptron: Architecture Optimization and Training. *International Journal of Interactive Multimedia and Artificial Intelligence*, 4(1), 26. <https://doi.org/10.9781/ijimai.2016.415>
- Rawansyah, Asmara, R. A., & Heryanto, T. A. (2019). Klasifikasi Varietas Biji Kopi Arabika Menggunakan Ekstraksi Bentuk dan Tekstur. *Seminar Informatika Aplikatif (SIAP)*, 316–322. <http://jurnalti.polinema.ac.id/index.php/SIAP/article/view/581>
- Raykov, T., & Marcoulides, G. A. (2008). *An Introduction to Applied Multivariate Analysis*. Taylor & Francis Group, LLC. <https://doi.org/10.4324/9780203809532>
- Reddy, G. T., Reddy, M. P. K., Lakshmana, K., Kaluri, R., Rajput, D. S., Srivastava, G., & Baker, T. (2020). Analysis of Dimensionality Reduction Techniques on Big Data. *IEEE Access*, 8, 54776–54788. <https://doi.org/10.1109/ACCESS.2020.2980942>
- Ribeiro, J. S., Ferreira, M. M. C., & Salva, T. J. G. (2011). Chemometric models for the quantitative descriptive sensory analysis of Arabica coffee beverages using near infrared spectroscopy. *Talanta*, 83(5), 1352–1358. <https://doi.org/10.1016/j.talanta.2010.11.001>
- Rodionova, O. Y., Titova, A. V., & Pomerantsev, A. L. (2016). Discriminant analysis is an inappropriate method of authentication. *TrAC - Trends in Analytical Chemistry*, 78, 17–22. <https://doi.org/10.1016/j.trac.2016.01.010>
- Saputra, I., & Kristiyanti, D. A. (2022). *Machine Learning untuk Pemula*. Informatika.
- Savitzky, A., & Golay, M. J. E. (1964). Smoothing and Differentiation of Data by Simplified Least Squares Procedures. *Analytical Chemistry*, 36(8), 1627–1639. <https://doi.org/10.1021/ac60214a048>
- Sharma, S., Sharma, S., & Anidhya, A. (2020). Understanding Activation Functions in Neural Networks. *International Journal of Engineering Applied Sciences and Technology*, 4(12), 310–316.
- Siesler, H., Ozaki, Y., Kawata, S., & Heise, H. (2002). *Near-infrared spectroscopy: Principles, instruments, applications*.
- Silalahi, D. D., Midi, H., Arasan, J., Mustafa, M. S., & Caliman, J. P. (2018). Robust generalized multiplicative scatter correction algorithm on pretreatment of near infrared spectral data. *Vibrational Spectroscopy*, 97(January), 55–65. <https://doi.org/10.1016/j.vibspec.2018.05.002>
- Silva, I. N. da, Spatti, D. H., Flauzino, R. A., Bartocci, L. H., & Alves, L. S. F. dos R. (2017). *Artificial Neural Networks: A Practical Course*. Springer International Publishing. <https://doi.org/10.1007/978-3-319-43162-8>
- Sun, D. (2012). *Computer vision technology in the food and beverage industries*. Woodhead Publishing Limited.
- Taud, H., & Mas, J. F. (2018). Multilayer perceptron (MLP). *Geomatic Approaches for Modeling Land Change Scenarios*, 451–455.
- Tran, H. T. M., Vargas, C. A. C., Slade Lee, L., Furtado, A., Smyth, H., & Henry, R. (2017). Variation in bean morphology and biochemical composition measured in different genetic groups of arabica coffee (*Coffea arabica* L.). *Tree Genetics and Genomes*, 13(3). <https://doi.org/10.1007/s11295-017-1138-8>

- Tu, J. V. (1996). Advantages and disadvantages of using artificial neural networks versus logistic regression for predicting medical outcomes. *Journal of Clinical Epidemiology*, 49(11), 1225–1231.
- Tugnolo, A., Giovenzana, V., Malegori, C., Oliveri, P., Casson, A., Curatitoli, M., Guidetti, R., & Beghi, R. (2021). A reliable tool based on near-infrared spectroscopy for the monitoring of moisture content in roasted and ground coffee: A comparative study with thermogravimetric analysis. *Food Control*, 130(February), 108312. <https://doi.org/10.1016/j.foodcont.2021.108312>
- Turi, B., Abebe, G., & Goro, G. (2013). Classification of Ethiopian Coffee Beans Using Imaging Techniques. *East African Journal of Sciences*, 7(1), 1–10.
- Vadivambal, R., & Jayas, D. S. (2016). *Bio-Imaging: Principles, Techniques, and Applications*. Taylor & Francis Group, LLC.
- Varmuza, K., & Filzmoser, P. (2009). *Introduction to multivariate statistical analysis in chemometrics*. Taylor & Francis Group, LLC.
- Velesaca, H. O., Suárez, P. L., Mira, R., & Sappa, A. D. (2021). Computer vision based food grain classification: A comprehensive survey. *Computers and Electronics in Agriculture*, 187(September 2020). <https://doi.org/10.1016/j.compag.2021.106287>
- Vieira, L. S., Assis, C., de Queiroz, M. E. L. R., Neves, A. A., & de Oliveira, A. F. (2021). Building robust models for identification of adulteration in olive oil using FT-NIR, PLS-DA and variable selection. *Food Chemistry*, 345(August 2020). <https://doi.org/10.1016/j.foodchem.2020.128866>
- Wang, A., Zhang, W., & Wei, X. (2019). A review on weed detection using ground-based machine vision and image processing techniques. *Computers and Electronics in Agriculture*, 158(February), 226–240. <https://doi.org/10.1016/j.compag.2019.02.005>
- Wang, H. P., Chen, P., Dai, J. W., Liu, D., Li, J. Y., Xu, Y. P., & Chu, X. L. (2022). Recent advances of chemometric calibration methods in modern spectroscopy: Algorithms, strategy, and related issues. *TrAC - Trends in Analytical Chemistry*, 153, 116648. <https://doi.org/10.1016/j.trac.2022.116648>
- Wirth, M. A. (2004). *Shape Analysis & Measurement Shape Analysis & Measurement*. University of Guelph, Computing and Information Science, Image Processing Group. <http://www.cyto.purdue.edu/cdroms/micro2/content/education/wirth10.pdf>
- Xiong, Z., Cui, Y., Liu, Z., Zhao, Y., Hu, M., & Hu, J. (2020). Evaluating explorative prediction power of machine learning algorithms for materials discovery using k-fold forward cross-validation. *Computational Materials Science*, 171(July 2019), 109203. <https://doi.org/10.1016/j.commatsci.2019.109203>
- Yadav, S., & Shukla, S. (2016). Analysis of k-Fold Cross-Validation over Hold-Out Validation on Colossal Datasets for Quality Classification. *Proceedings - 6th International Advanced Computing Conference, IACC 2016, Cv*, 78–83. <https://doi.org/10.1109/IACC.2016.25>
- Yang, H., Xiaofeng, D., Chan, R., Hu, H., Peng, Y., & Zeng, T. (2020). A new initialization method based on normed statistical spaces in deep networks. *Inverse Probl Imaging*, 15, 147. <https://doi.org/10.3934/xx.xx.xx.xx>
- Yusmanizar, & Munawar, A. A. (2021). Environmental origin classification of coffee beans using infrared spectroscopy. *IOP Conference Series: Earth and Environmental Science*,



922(1). <https://doi.org/10.1088/1755-1315/922/1/012014>

- Yusmanizar, Setiasih, I. S., Nurjanah, S., Muhaemin, M., Nurhadi, B., Rosniawaty, S., & Munawar, A. A. (2019). Fast and Non-Destructive Prediction of Moisture Content and Chologenic Acid of Intact Coffee Beans Using Near Infrared Reflectance Spectroscopy. *IOP Conference Series: Materials Science and Engineering*, 506(1). <https://doi.org/10.1088/1757-899X/506/1/012033>
- Zhang, C., Zhang, S., Yang, J., Shi, Y., & Chen, J. (2017). Apple leaf disease identification using genetic algorithm and correlation based feature selection method. *International Journal of Agricultural and Biological Engineering*, 10(2), 74–83. <https://doi.org/10.3965/j.ijabe.20171002.2166>
- Zheng, W., Fu, X., & Ying, Y. (2014). Spectroscopy-based food classification with extreme learning machine. *Chemometrics and Intelligent Laboratory Systems*, 139, 42–47. <https://doi.org/10.1016/j.chemolab.2014.09.015>