[258] E. Bauriegel and W. B. Herppich, "Hyperspectral and chlorophyll fluorescence imaging for early detection of plant diseases, with special reference to Fusarium spec. infections on wheat," *Agriculture*, vol. 4, no. 1, pp. 32–57, 2014.

[259] A. C. Burnett et al., "A best-practice guide to predicting plant traits from leaf-level hyperspectral data using partial least squares regression," *J. Exp. Botany*, vol. 72, no. 18, pp. 6175–6189, 2021.

[260] J. U. Fajardo et al., "Early detection of black Sigatoka in banana leaves using hyperspectral images," *Appl. Plant Sci.*, vol. 8, no. 8, 2020, Art. no. e11383.

[261] F. Wang, J. Gao, and Y. Zha, "Hyperspectral sensing of heavy metals in soil and vegetation: Feasibility and challenges," *J. Photogrammetry Remote Sens.*, vol. 136, pp. 73–84, 2018.

[262] B. Tugrul, E. Elfatimi, and R. Eryigit, "Convolutional neural networks in detection of plant leaf diseases: A review," *Agriculture*, vol. 12, no. 8, 2022, Art. no. 1192.

[263] Z. Jian and Z. Wei, "Support vector machine for recognition of cucumber leaf diseases," in *Proc. 2nd Int. Conf. Adv. Comput. Control*, 2010, pp. 264–266.

[264] M. R. Mia, S. Roy, S. K. Das, and M. A. Rahman, "Mango leaf disease recognition using neural network and support vector machine," *Iran J. Comput. Sci.*, vol. 3, pp. 185–193, 2020.

[265] D. Moshou, C. Bravo, J. West, S. Wahlen, A. McCartney, and H. Ramon, "Automatic detection of 'yellow rust' in wheat using reflectance measurements and neural networks," in *Comput. Electron. Agriculture*, vol. 44, no. 3, pp. 173–188, 2004.

[266] B. K. Hatuwal, A. Shakya, and B. Joshi, "Plant leaf disease recognition using random forest, KNN, SVM and CNN," *Polibits*, vol. 62, pp. 13–19, 2020.

[267] M. Suresha, K. Shreekanth, and B. Thirumalesh, "Recognition of diseases in paddy leaves using KNN classifier," in *Proc. 2nd Int. Conf. Convergence Technol.*, 2017, pp. 663–666.

[268] V. S. Sahithi, S. Subbiah, and S. Agrawal, "Comparison of support vector machine, artificial neural networks and spectral angle mapper classifiers on fused hyperspectral data for improved LULC classification," in *Proc. 8th Int. Conf. Model. Simul. Appl. Optim.*, 2019, pp. 1–6.

[269] K. P. Panigrahi, H. Das, A. K. Sahoo, and S. C. Moharana, "Maize leaf disease detection and classification using machine learning algorithms," in *Proc. Prog. Comput., Analytics Netw.*, 2020, pp. 659–669.

[270] G. Zhang, T. Xu, Y. Tian, H. Xu, J. Song, and Y. Lan, "Assessment of rice leaf blast severity using hyperspectral imaging during late vegetative growth," *Australas. Plant Pathol.*, vol. 49, no. 5, pp. 571–578, 2020.

[271] K. Kersting et al., "Pre-symptomatic prediction of plant drought stress using Dirichlet-aggregation regression on hyperspectral images," in *Proc. AAAI Conf. Artif. Intell.*, 2012, pp. 302–308.

[272] K. Ahmed, T. R. Shahidi, S. M. I. Alam, and S. Momen, "Rice leaf disease detection using machine learning techniques," in *Proc. Int. Conf. Sustain. Technol. Ind. 4.0*, 2019, pp. 1–5.

[273] A. M. Roy and J. Bhaduri, "A deep learning enabled multi-class plant disease detection model based on computer vision," *AI*, vol. 2, no. 3, pp. 413–428, 2021.

[274] J. Zhang et al., "Diagnosing the symptoms of sheath blight disease on rice stalk with an in-situ hyperspectral imaging technique," *Biosyst. Eng.*, vol. 209, pp. 94–105, 2021.

[275] L. Yuan et al., "Detection of anthracnose in tea plants based on hyperspectral imaging," *Comput. Electron. Agriculture*, vol. 167, 2019, Art. no. 105039.

[276] A. Krizhevsky, I. Sutskever, and G. E. Hinton, "ImageNet classification with deep convolutional neural networks," in *Proc. Int. Conf. Neural Inf. Process. Syst.*, 2012, pp. 1–9.

[277] G. E. Hinton, S. Osindero, and Y.-W. Teh, "A fast learning algorithm for deep belief nets," *Neural Computation*, vol. 18, no. 7, pp. 1527–1554, 2006.

[278] G. E. Hinton and R. R. Salakhutdinov, "Reducing the dimensionality of data with neural networks," *Science*, vol. 313, no. 5786, pp. 504–507, 2006.

[279] M. P. Finn et al., "Remote sensing of soil moisture using airborne hyperspectral data," *GISci. Remote Sens.*, vol. 48, no. 4, pp. 522–540, 2011.

[280] B. Lu and Y. He, "Evaluating empirical regression, machine learning, and radiative transfer modelling for estimating vegetation chlorophyll content using bi-seasonal hyperspectral images," *Remote Sens.*, vol. 11, no. 17, 2019, Art. no. 1979.

[281] A. Tong and Y. He, "Estimating and mapping chlorophyll content for a heterogeneous grassland: Comparing prediction power of a suite of vegetation indices across scales between years," *ISPRS J. Photogrammetry Remote Sens.*, vol. 126, pp. 146–167, 2017.

[282] P. Hansen and J. Schjoerring, "Reflectance measurement of canopy biomass and nitrogen status in wheat crops using normalized difference vegetation indices and partial least squares regression," *Remote Sens. Environ.*, vol. 86, no. 4, pp. 542–553, 2003.

[283] H. T. Nguyen and B.-W. Lee, "Assessment of rice leaf growth and nitrogen status by hyperspectral canopy reflectance and partial least square regression," *Eur. J. Agronomy*, vol. 24, no. 4, pp. 349–356, 2006.

[284] C. Ryu, M. Suguri, and M. Umeda, "Multivariate analysis of nitrogen content for rice at the heading stage using reflectance of airborne hyperspectral remote sensing," *Field Crops Res.*, vol. 122, no. 3, pp. 214–224, 2011.

[285] T. Jarmer, "Spectroscopy and hyperspectral imagery for monitoring summer barley," *Int. J. Remote Sens.*, vol. 34, no. 17, pp. 6067–6078, 2013.

[286] B. Siegmann, T. Jarmer, F. Beyer, and M. Ehlers, "The potential of pan-sharpened EnMAP data for the assessment of wheat LAI," *Remote Sens.*, vol. 7, no. 10, pp. 12737–12762, 2015.

[287] K. Were, D. T. Bui, Ø. B. Dick, and B. R. Singh, "A comparative assessment of support vector regression, artificial neural networks, and random forests for predicting and mapping soil organic carbon stocks across an afromontane landscape," *Ecol. Indicators*, vol. 52, pp. 394–403, 2015.

[288] J. Gao, D. Nuyttens, P. Lootens, Y. He, and J. G. Pieters, "Recognising weeds in a maize crop using a random forest machine-learning algorithm and near-infrared snapshot mosaic hyperspectral imagery," *Biosyst. Eng.*, vol. 170, pp. 39–50, 2018.

[289] S. P. Mohanty, D. P. Hughes, and M. Salathé, "Using deep learning for image-based plant disease detection," *Front. Plant Sci.*, vol. 7, 2016, Art. no. 1419.

[290] A. Kamilaris and F. X. Prenafeta-Boldú, "Deep learning in agriculture: A survey," *Comput. Electron. Agriculture*, vol. 147, pp. 70–90, 2018.

[291] A. K. Singh, B. Ganapathysubramanian, S. Sarkar, and A. Singh, "Deep learning for plant stress phenotyping: Trends and future perspectives," *Trends Plant Sci.*, vol. 23, no. 10, pp. 883–898, 2018.

[292] S. Azimi, R. Wadhawan, and T. K. Gandhi, "Intelligent monitoring of stress induced by water deficiency in plants using deep learning," *IEEE Trans. Instrum. Meas.*, vol. 70, 2021, Art. no. 5017113.

[293] S. Hazarika, R. Choudhury, B. Montazer, S. Medhi, M. P. Goswami, and U. Sarma, "Detection of citrus Tristeza virus in mandarin orange using a custom-developed electronic nose system," *IEEE Trans. Instrum. Meas.*, vol. 69, no. 11, pp. 9010–9018, Nov. 2020.

[294] M. Shahbandeh, "Wheat production volume in Canada 2010-2021)," *Statista*, Apr. 2022. Accessed: Jul. 17, 2022. [Online]. Available: https://www.statista.com

[295] A.-K. Mahlein et al., "Quantitative and qualitative phenotyping of disease resistance of crops by hyperspectral sensors: Seamless interlocking of phytopathology, sensors, and machine learning is needed!," *Curr. Opin. Plant Biol.*, vol. 50, pp. 156–162, 2019.

[296] J.-C. Zhang, R. Pu, J. Wang, W. Huang, L. Yuan, and J.-H. Luo, "Detecting powdery mildew of winter wheat using leaf level hyperspectral measurements," *Comput. Electron. Agriculture*, vol. 85, pp. 13–23, 2012.

[297] S. S. Ray, N. Jain, R. Arora, S. Chavan, and S. Panigrahy, "Utility of hyperspectral data for potato late blight disease detection," *J. Indian Soc. Remote Sens.*, vol. 39, no. 2, pp. 161–169, 2011.

[298] P. Moghadam, D. Ward, E. Goan, S. Jayawardena, P. Sikka, and E. Hernandez, "Plant disease detection using hyperspectral imaging," in *Proc. Int. Conf. Digit. Image Comput.: Techn. Appl.*, 2017, pp. 1–8.

[299] M. Zhang, Z. Qin, X. Liu, and S. L. Ustin, "Detection of stress in tomatoes induced by late blight disease in California, USA, using hyperspectral remote sensing," *Int. J. Appl. Earth Observ. Geoinf.*, vol. 4, no. 4, pp. 295–310, 2003.

[300] H. Orchi, M. Sadik, and M. Khaldoun, "On using artificial intelligence and the Internet of Things for crop disease detection: A contemporary survey," *Agriculture*, vol. 12, no. 1, 2021, Art. no. 9.

[301] A. Moghimi, C. Yang, and P. M. Marchetto, "Ensemble feature selection for plant phenotyping: A journey from hyperspectral to multispectral imaging," *IEEE Access*, vol. 6, pp. 56870–56884, 2018.

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