References

[1] P. Suetens, *Fundamentals of medical imaging*. Cambridge university press, 2017.

[2] J. Beutel, H. L. Kundel, Y. Kim, R. L. Van Metter, and S. C. Horii, *Handbook of medical imaging: display and PACS*. Spie Press, 2000.

[3] E. L. Tung and R. Shailam, "Developing a Learning Objective-Based Pediatric Radiology Curriculum to Supplement Resident Education," *Current Problems in Diagnostic Radiology,* 2022.

[4] S. Hu, H. Kang, Y. Baek, G. El Fakhri, A. Kuang, and H. S. Choi, "Real-time imaging of brain tumor for image-guided surgery," *Advanced healthcare materials,* vol. 7, no. 16, p. 1800066, 2018.

[5] D. Lu and Q. Weng, "A survey of image classification methods and techniques for improving classification performance," *International journal of Remote sensing,* vol. 28, no. 5, pp. 823-870, 2007.

[6] F. P. Oliveira and J. M. R. Tavares, "Medical image registration: a review," *Computer methods in biomechanics and biomedical engineering,* vol. 17, no. 2, pp. 73-93, 2014.

[7] D. D. Patil and S. G. Deore, "Medical image segmentation: a review," *International Journal of Computer Science and Mobile Computing,* vol. 2, no. 1, pp. 22-27, 2013.

[8] J. Ker, L. Wang, J. Rao, and T. Lim, "Deep learning applications in medical image analysis," *Ieee Access,* vol. 6, pp. 9375-9389, 2017.

[9] R. Jenkins, "X-ray techniques: overview," *Encyclopedia of analytical chemistry,* pp. 1-20, 2000.

[10] X. Ou *et al.*, "Recent development in X-ray imaging technology: future and challenges," *Research,* vol. 2021, 2021.

[11] C. Seibold *et al.*, "Detailed Annotations of Chest X-Rays via CT Projection for Report Understanding," *arXiv preprint arXiv:2210.03416,* 2022.

[12] B. Stevens, L. Skermer, and J. Davies, "Radiographers reporting chest X-ray images: identifying the service enablers and challenges in England, UK," *Radiography,* vol. 27, no. 4, pp. 1006-1013, 2021.

[13] S. Dara and P. Tumma, "Feature extraction by using deep learning: A survey," in *2018 Second international conference on electronics, communication and aerospace technology (ICECA)*, 2018: IEEE, pp. 1795-1801.

[14] H. Fujita, "AI-based computer-aided diagnosis (AI-CAD): the latest review to read first," *Radiological physics and technology,* vol. 13, no. 1, pp. 6-19, 2020.

[15] B. R. Hunde and A. D. Woldeyohannes, "Future prospects of computer-aided design (CAD)–A review from the perspective of artificial intelligence (AI), extended reality, and 3D printing," *Results in Engineering,* p. 100478, 2022.

[16] S. Albawi, T. A. Mohammed, and S. Al-Zawi, "Understanding of a convolutional neural network," in *2017 international conference on engineering and technology (ICET)*, 2017: Ieee, pp. 1-6.

[17] Z. Li, F. Liu, W. Yang, S. Peng, and J. Zhou, "A survey of convolutional neural networks: analysis, applications, and prospects," *IEEE transactions on neural networks and learning systems,* 2021.

[18] F. Sultana, A. Sufian, and P. Dutta, "Evolution of image segmentation using deep convolutional neural network: A survey," *Knowledge-Based Systems,* vol. 201, p. 106062, 2020.

[19] E. Bousias Alexakis and C. Armenakis, "Evaluation of UNet and UNet++ architectures in high resolution image change detection applications," *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences,* vol. 43, pp. 1507-1514, 2020.

[20] C. Liu *et al.*, "Auto-deeplab: Hierarchical neural architecture search for semantic image segmentation," in *Proceedings of the IEEE/CVF conference on computer vision and pattern recognition*, 2019, pp. 82-92.

[21] D. Bhatt *et al.*, "CNN variants for computer vision: history, architecture, application, challenges and future scope," *Electronics,* vol. 10, no. 20, p. 2470, 2021.

[22] A. Sengupta, Y. Ye, R. Wang, C. Liu, and K. Roy, "Going deeper in spiking neural networks: VGG and residual architectures," *Frontiers in neuroscience,* vol. 13, p. 95, 2019.

[23] S. Targ, D. Almeida, and K. Lyman, "Resnet in resnet: Generalizing residual architectures," *arXiv preprint arXiv:1603.08029,* 2016.

[24] S. A. Azer, "Deep learning with convolutional neural networks for identification of liver masses and hepatocellular carcinoma: A systematic review," *World journal of gastrointestinal oncology,* vol. 11, no. 12, p. 1218, 2019.

[25] P. Mathur, S. Srivastava, X. Xu, and J. L. Mehta, "Artificial intelligence, machine learning, and cardiovascular disease," *Clinical Medicine Insights: Cardiology,* vol. 14, p. 1179546820927404, 2020.

[26] E. Altinkaya, K. Polat, and B. Barakli, "Detection of Alzheimer's disease and dementia states based on deep learning from MRI images: a comprehensive review," *Journal of the Institute of Electronics and Computer,* vol. 1, no. 1, pp. 39-53, 2020.

[27] S. Kumar, P. Singh, and M. Ranjan, "A review on deep learning based pneumonia detection systems," in *2021 International Conference on Artificial Intelligence and Smart Systems (ICAIS)*, 2021: IEEE, pp. 289-296.

[28] A. Halder, D. Dey, and A. K. Sadhu, "Lung nodule detection from feature engineering to deep learning in thoracic CT images: a comprehensive review," *Journal of digital imaging,* vol. 33, no. 3, pp. 655-677, 2020.

[29] M. L. Richter, W. Byttner, U. Krumnack, A. Wiedenroth, L. Schallner, and J. Shenk, "(Input) Size Matters for CNN Classifiers," in *Artificial Neural Networks and Machine Learning–ICANN 2021: 30th International Conference on Artificial Neural Networks, Bratislava, Slovakia, September 14–17, 2021, Proceedings, Part II 30*, 2021: Springer, pp. 133-144.

[30] L. Zheng, Y. Zhao, S. Wang, J. Wang, and Q. Tian, "Good practice in CNN feature transfer," *arXiv preprint arXiv:1604.00133,* 2016.

[31] J. Shiraishi *et al.*, "Development of a digital image database for chest radiographs with and without a lung nodule: receiver operating characteristic analysis of radiologists' detection of pulmonary nodules," *American Journal of Roentgenology,* vol. 174, no. 1, pp. 71-74, 2000.

[32] P. C. Prorok *et al.*, "Design of the prostate, lung, colorectal and ovarian (PLCO) cancer screening trial," *Controlled clinical trials,* vol. 21, no. 6, pp. 273S-309S, 2000.

[33] S. Jaeger, S. Candemir, S. Antani, Y.-X. J. Wáng, P.-X. Lu, and G. Thoma, "Two public chest X-ray datasets for computer-aided screening of pulmonary diseases," *Quantitative imaging in medicine and surgery,* vol. 4, no. 6, p. 475, 2014.

[34] T. Rahman *et al.*, "Exploring the effect of image enhancement techniques on COVID-19 detection using chest X-ray images," *Computers in biology and medicine,* vol. 132, p. 104319, 2021.

[35] F. Pesapane, C. Volonté, M. Codari, and F. Sardanelli, "Artificial intelligence as a medical device in radiology: ethical and regulatory issues in Europe and the United States," *Insights into imaging,* vol. 9, pp. 745-753, 2018.

[36] L. Saba *et al.*, "The present and future of deep learning in radiology," *European journal of radiology,* vol. 114, pp. 14-24, 2019.

[37] T. G. Debelee, F. Schwenker, A. Ibenthal, and D. Yohannes, "Survey of deep learning in breast cancer image analysis," *Evolving Systems,* vol. 11, pp. 143-163, 2020.

[38] T. Rahman *et al.*, "Transfer learning with deep convolutional neural network (CNN) for pneumonia detection using chest X-ray," *Applied Sciences,* vol. 10, no. 9, p. 3233, 2020.

[39] Nillmani *et al.*, "Four Types of Multiclass Frameworks for Pneumonia Classification and Its Validation in X-ray Scans Using Seven Types of Deep Learning Artificial Intelligence Models," *Diagnostics,* vol. 12, no. 3, p. 652, 2022. [Online]. Available: https://www.mdpi.com/2075-4418/12/3/652.

[40] C. Sitaula and M. B. Hossain, "Attention-based VGG-16 model for COVID-19 chest X-ray image classification," *Applied Intelligence,* vol. 51, pp. 2850-2863, 2021.

[41] V. Sorin, Y. Barash, E. Konen, and E. Klang, "Creating artificial images for radiology applications using generative adversarial networks (GANs)–a systematic review," *Academic radiology,* vol. 27, no. 8, pp. 1175-1185, 2020.

[42] R. Hooda, A. Mittal, and S. Sofat, "An efficient variant of fully-convolutional network for segmenting lung fields from chest radiographs," *Wireless Personal Communications,* vol. 101, pp. 1559-1579, 2018.

[43] T. A. Ngo and G. Carneiro, "Lung segmentation in chest radiographs using distance regularized level set and deep-structured learning and inference," in *2015 IEEE International Conference on Image Processing (ICIP)*, 2015: IEEE, pp. 2140-2143.

[44] L. Saidy and C.-C. Lee, "Chest X-ray image segmentation using encoder-decoder convolutional network," in *2018 IEEE International Conference on Consumer Electronics-Taiwan (ICCE-TW)*, 2018: IEEE, pp. 1-2.

[45] A. Mittal, R. Hooda, and S. Sofat, "LF-SegNet: A fully convolutional encoder–decoder network for segmenting lung fields from chest radiographs," *Wireless Personal Communications,* vol. 101, pp. 511-529, 2018.

[46] J. C. Souza, J. O. B. Diniz, J. L. Ferreira, G. L. F. da Silva, A. C. Silva, and A. C. de Paiva, "An automatic method for lung segmentation and reconstruction in chest X-ray using deep neural networks," *Computer methods and programs in biomedicine,* vol. 177, pp. 285-296, 2019.

[47] N. Reamaroon *et al.*, "Robust segmentation of lung in chest x-ray: applications in analysis of acute respiratory distress syndrome," *BMC Medical Imaging,* vol. 20, no. 1, pp. 1-13, 2020.

[48] F. Munawar, S. Azmat, T. Iqbal, C. Grönlund, and H. Ali, "Segmentation of lungs in chest X-ray image using generative adversarial networks," *Ieee Access,* vol. 8, pp. 153535-153545, 2020.

[49] L. Zhang, A. Liu, J. Xiao, and P. Taylor, "Dual encoder fusion u-net (defu-net) for cross-manufacturer chest x-ray segmentation," in *2020 25th International Conference on Pattern Recognition (ICPR)*, 2021: IEEE, pp. 9333-9339.

[50] L. O. Teixeira *et al.*, "Impact of lung segmentation on the diagnosis and explanation of COVID-19 in chest X-ray images," *Sensors,* vol. 21, no. 21, p. 7116, 2021.

[51] G. Gaál, B. Maga, and A. Lukács, "Attention u-net based adversarial architectures for chest x-ray lung segmentation," *arXiv preprint arXiv:2003.10304,* 2020.

[52] M. Z. Alom, M. Rahman, M. S. Nasrin, T. M. Taha, and V. K. Asari, "COVID_MTNet: COVID-19 detection with multi-task deep learning approaches," *arXiv preprint arXiv:2004.03747,* 2020.

[53] Y. Oh, S. Park, and J. C. Ye, "Deep learning COVID-19 features on CXR using limited training data sets," *IEEE transactions on medical imaging,* vol. 39, no. 8, pp. 2688-2700, 2020.

[54] S. R. Nayak, D. R. Nayak, U. Sinha, V. Arora, and R. B. Pachori, "Application of deep learning techniques for detection of COVID-19 cases using chest X-ray images: A comprehensive study," *Biomedical Signal Processing and Control,* vol. 64, p. 102365, 2021.

[55] M. E. Chowdhury *et al.*, "Can AI help in screening viral and COVID-19 pneumonia?," *Ieee Access,* vol. 8, pp. 132665-132676, 2020.

[56] R. Jain, M. Gupta, S. Taneja, and D. J. Hemanth, "Deep learning based detection and analysis of COVID-19 on chest X-ray images," *Applied Intelligence,* vol. 51, pp. 1690-1700, 2021.

[57] A. I. Khan, J. L. Shah, and M. M. Bhat, "CoroNet: A deep neural network for detection and diagnosis of COVID-19 from chest x-ray images," *Computer methods and programs in biomedicine,* vol. 196, p. 105581, 2020.

[58] E. Hussain, M. Hasan, M. A. Rahman, I. Lee, T. Tamanna, and M. Z. Parvez, "CoroDet: A deep learning based classification for COVID-19 detection using chest X-ray images," *Chaos, Solitons & Fractals,* vol. 142, p. 110495, 2021.

[59] R. M. Wehbe *et al.*, "DeepCOVID-XR: an artificial intelligence algorithm to detect COVID-19 on chest radiographs trained and tested on a large US clinical data set," *Radiology,* vol. 299, no. 1, pp. E167-E176, 2021.

[60] D. Keidar *et al.*, "COVID-19 classification of X-ray images using deep neural networks," *European radiology,* vol. 31, no. 12, pp. 9654-9663, 2021.

[61] V. Nikolaou, S. Massaro, M. Fakhimi, L. Stergioulas, and W. Garn, "COVID-19 diagnosis from chest x-rays: developing a simple, fast, and accurate neural network," *Health information science and systems,* vol. 9, pp. 1-11, 2021.

[62] D. Yang, C. Martinez, L. Visuña, H. Khandhar, C. Bhatt, and J. Carretero, "Detection and analysis of COVID-19 in medical images using deep learning techniques," *Scientific Reports,* vol. 11, no. 1, p. 19638, 2021.

[63] A. H. Al-Timemy, R. N. Khushaba, Z. M. Mosa, and J. Escudero, "An efficient mixture of deep and machine learning models for covid-19 and tuberculosis detection using x-ray images in resource limited settings," *Artificial Intelligence for COVID-19,* pp. 77-100, 2021.

[64] H. Abdulah *et al.*, "CXR-Net: an artificial intelligence pipeline for quick COVID-19 screening of chest X-rays," *arXiv preprint arXiv:2103.00087,* 2021.

[65] A. Bhattacharyya, D. Bhaik, S. Kumar, P. Thakur, R. Sharma, and R. B. Pachori, "A deep learning based approach for automatic detection of COVID-19 cases using chest X-ray images," *Biomedical Signal Processing and Control,* vol. 71, p. 103182, 2022.

[66] Y. Xu, H.-K. Lam, and G. Jia, "MANet: A two-stage deep learning method for classification of COVID-19 from Chest X-ray images," *Neurocomputing,* vol. 443, pp. 96-105, 2021.

[67] H. Zhao *et al.*, "SC2Net: A novel segmentation-based classification network for detection of COVID-19 in chest X-ray images," *IEEE Journal of Biomedical and Health Informatics,* vol. 26, no. 8, pp. 4032-4043, 2022.

[68] E. Khan, M. Z. U. Rehman, F. Ahmed, F. A. Alfouzan, N. M. Alzahrani, and J. Ahmad, "Chest X-ray classification for the detection of COVID-19 using deep learning techniques," *Sensors,* vol. 22, no. 3, p. 1211, 2022.

[69] R. Hertel and R. Benlamri, "A deep learning segmentation-classification pipeline for x-ray-based covid-19 diagnosis," *Biomedical Engineering Advances,* vol. 3, p. 100041, 2022.

[70] M. F. Aslan, K. Sabanci, A. Durdu, and M. F. Unlersen, "COVID-19 diagnosis using state-of-the-art CNN architecture features and Bayesian Optimization," *Computers in biology and medicine,* p. 105244, 2022.

[71] A. M. Baig, "Neurological manifestations in COVID-19 caused by SARS-CoV-2," *CNS neuroscience & therapeutics,* vol. 26, no. 5, p. 499, 2020.

[72] N. Zhu *et al.*, "A novel coronavirus from patients with pneumonia in China, 2019," *New England journal of medicine,* 2020.

[73] D. Cucinotta and M. Vanelli, "WHO declares COVID-19 a pandemic," *Acta bio medica: Atenei parmensis,* vol. 91, no. 1, p. 157, 2020.

[74] P. V'kovski, A. Kratzel, S. Steiner, H. Stalder, and V. Thiel, "Coronavirus biology and replication: implications for SARS-CoV-2," *Nature Reviews Microbiology,* vol. 19, no. 3, pp. 155-170, 2021.

[75] M. Pal, G. Berhanu, C. Desalegn, and V. Kandi, "Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2): an update," *Cureus,* vol. 12, no. 3, 2020.

[76] L. Saba *et al.*, "Molecular pathways triggered by COVID-19 in different organs: ACE2 receptor-expressing cells under attack? A review," *European Review for Medical and Pharmacological Sciences,* vol. 24, no. 23, pp. 12609-12622, 2020.

[77] R. Cau *et al.*, "Complications in COVID-19 patients: Characteristics of pulmonary embolism," *Clinical Imaging,* vol. 77, pp. 244-249, 2021.

[78] C. Gerosa *et al.*, "Fetal programming of COVID-19: May the barker hypothesis explain the susceptibility of a subset of young adults to develop severe disease," *Eur. Rev. Med. Pharmacol. Sci,* vol. 25, pp. 5876-5884, 2021.

[79] H. K. Koh, A. C. Geller, and T. J. VanderWeele, "Deaths from COVID-19," *Jama,* vol. 325, no. 2, pp. 133-134, 2021.

[80] G. Ciminelli and S. Garcia-Mandicó, "COVID-19 in Italy: an analysis of death registry data," *Journal of Public Health,* vol. 42, no. 4, pp. 723-730, 2020.

[81] X. He, W. Hong, X. Pan, G. Lu, and X. Wei, "SARS-CoV-2 Omicron variant: characteristics and prevention," *MedComm,* vol. 2, no. 4, pp. 838-845, 2021.

[82] W. Wang *et al.*, "Detection of SARS-CoV-2 in different types of clinical specimens," *Jama,* vol. 323, no. 18, pp. 1843-1844, 2020.

[83] R. Cau *et al.*, "CT findings of COVID-19 pneumonia in ICU-patients," *Journal of Public Health Research,* vol. 10, no. 3, p. jphr. 2021.2270, 2021.

[84] P. S. Wikramaratna, R. S. Paton, M. Ghafari, and J. Lourenço, "Estimating the false-negative test probability of SARS-CoV-2 by RT-PCR," *Eurosurveillance,* vol. 25, no. 50, p. 2000568, 2020.

[85] Y. Li *et al.*, "Stability issues of RT-PCR testing of SARS-CoV-2 for hospitalized patients clinically diagnosed with COVID-19," *Journal of medical virology,* vol. 92, no. 7, pp. 903-908, 2020.

[86] T. Yang and Y. Wang, "C, Shen C-F, Cheng C-M," *Point-of-care RNA-based diagnostic device for COVID-19 Point-of-Care RNA-Based Diagnostic Device for COVID-19. Multidisciplinary Digital Publishing Institute,* vol. 165, 2020.

[87] M.-Y. Ng *et al.*, "Imaging profile of the COVID-19 infection: radiologic findings and literature review," *Radiology: Cardiothoracic Imaging,* vol. 2, no. 1, p. e200034, 2020.

[88] H. Liu, F. Liu, J. Li, T. Zhang, D. Wang, and W. Lan, "Clinical and CT imaging features of the COVID-19 pneumonia: Focus on pregnant women and children," *Journal of infection,* vol. 80, no. 5, pp. e7-e13, 2020.

[89] M. Chung *et al.*, "CT imaging features of 2019 novel coronavirus (2019-nCoV)," *Radiology,* vol. 295, no. 1, pp. 202-207, 2020.

[90] L. J. Kroft, L. van der Velden, I. H. Girón, J. J. Roelofs, A. de Roos, and J. Geleijns, "Added value of ultra–low-dose computed tomography, dose equivalent to chest x-ray radiography, for diagnosing chest pathology," *Journal of thoracic imaging,* vol. 34, no. 3, p. 179, 2019.

[91] N. Chen *et al.*, "Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study," *The lancet,* vol. 395, no. 10223, pp. 507-513, 2020.

[92] C. Huang *et al.*, "Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China," *The lancet,* vol. 395, no. 10223, pp. 497-506, 2020.

[93] V. M. Corman *et al.*, "Detection of 2019 novel coronavirus (2019-nCoV) by real-time RT-PCR," *Eurosurveillance,* vol. 25, no. 3, p. 2000045, 2020.

[94] D. K. Chu *et al.*, "Molecular diagnosis of a novel coronavirus (2019-nCoV) causing an outbreak of pneumonia," *Clinical chemistry,* vol. 66, no. 4, pp. 549-555, 2020.

[95] S. Salehi, A. Abedi, S. Balakrishnan, and A. Gholamrezanezhad, "Coronavirus disease 2019 (COVID-19): a systematic review of imaging findings in 919 patients," *Ajr Am J Roentgenol,* vol. 215, no. 1, pp. 87-93, 2020.

[96] S. M. Anwar, M. Majid, A. Qayyum, M. Awais, M. Alnowami, and M. K. Khan, "Medical image analysis using convolutional neural networks: a review," *Journal of medical systems,* vol. 42, pp. 1-13, 2018.

[97] M. W. Nadeem *et al.*, "Brain tumor analysis empowered with deep learning: A review, taxonomy, and future challenges," *Brain sciences,* vol. 10, no. 2, p. 118, 2020.

[98] S. Tripathi, A. Verma, and N. Sharma, "Automatic segmentation of brain tumour in MR images using an enhanced deep learning approach," *Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization,* vol. 9, no. 2, pp. 121-130, 2021.

[99] M. Singh, A. Verma, and N. Sharma, "Optimized multistable stochastic resonance for the enhancement of pituitary microadenoma in MRI," *IEEE journal of biomedical and health informatics,* vol. 22, no. 3, pp. 862-873, 2017.

[100] M. Singh, A. Verma, and N. Sharma, "Bat optimization based neuron model of stochastic resonance for the enhancement of MR images," *Biocybernetics and Biomedical Engineering,* vol. 37, no. 1, pp. 124-134, 2017.

[101] X. Liu, K.-W. Li, R. Yang, and L.-S. Geng, "Review of deep learning based automatic segmentation for lung cancer radiotherapy," *Frontiers in Oncology,* vol. 11, p. 717039, 2021.

[102] P. K. Jain *et al.*, "Unseen artificial intelligence—Deep learning paradigm for segmentation of low atherosclerotic plaque in carotid ultrasound: A multicenter cardiovascular study," *Diagnostics,* vol. 11, no. 12, p. 2257, 2021.

[103] P. K. Jain, N. Sharma, A. A. Giannopoulos, L. Saba, A. Nicolaides, and J. S. Suri, "Hybrid deep learning segmentation models for atherosclerotic plaque in internal carotid artery B-mode ultrasound," *Computers in Biology and Medicine,* vol. 136, p. 104721, 2021.

[104] F. Zhuang *et al.*, "A comprehensive survey on transfer learning," *Proceedings of the IEEE,* vol. 109, no. 1, pp. 43-76, 2020.

[105] M. A. Morid, A. Borjali, and G. Del Fiol, "A scoping review of transfer learning research on medical image analysis using ImageNet," *Computers in biology and medicine,* vol. 128, p. 104115, 2021.

[106] E. E.-D. Hemdan, M. A. Shouman, and M. E. Karar, "Covidx-net: A framework of deep learning classifiers to diagnose covid-19 in x-ray images," *arXiv preprint arXiv:2003.11055,* 2020.

[107] L. N. Mahdy, K. A. Ezzat, H. H. Elmousalami, H. A. Ella, and A. E. Hassanien, "Automatic x-ray covid-19 lung image classification system based on multi-level thresholding and support vector machine," *MedRxiv,* p. 2020.03. 30.20047787, 2020.

[108] I. D. Apostolopoulos and T. A. Mpesiana, "Covid-19: automatic detection from x-ray images utilizing transfer learning with convolutional neural networks," *Physical and engineering sciences in medicine,* vol. 43, pp. 635-640, 2020.

[109] P. K. Sethy and S. K. Behera, "Detection of coronavirus disease (covid-19) based on deep features," 2020.

[110] T. Ozturk, M. Talo, E. A. Yildirim, U. B. Baloglu, O. Yildirim, and U. R. Acharya, "Automated detection of COVID-19 cases using deep neural networks with X-ray images," *Computers in biology and medicine,* vol. 121, p. 103792, 2020.

[111] L. Wang, Z. Q. Lin, and A. Wong, "Covid-net: A tailored deep convolutional neural network design for detection of covid-19 cases from chest x-ray images," *Scientific reports,* vol. 10, no. 1, pp. 1-12, 2020.

[112] P. Afshar, S. Heidarian, F. Naderkhani, A. Oikonomou, K. N. Plataniotis, and A. Mohammadi, "Covid-caps: A capsule network-based framework for identification of covid-19 cases from x-ray images," *Pattern Recognition Letters,* vol. 138, pp. 638-643, 2020.

[113] S. D. Deb, R. K. Jha, K. Jha, and P. S. Tripathi, "A multi model ensemble based deep convolution neural network structure for detection of COVID19," *Biomedical Signal Processing and Control,* vol. 71, p. 103126, 2022.

[114] "COVID-19 Radiography Database." https://www.kaggle.com/datasets/tawsifurrahman/covid19-radiography-database (accessed 01 October, 2021).

[115] "Tuberculosis (TB) Chest X-ray Database." https://www.kaggle.com/datasets/tawsifurrahman/tuberculosis-tb-chest-xray-dataset (accessed 01 October, 2021).

[116] "Chest X-Ray Images (Pneumonia)." https://www.kaggle.com/datasets/paultimothymooney/chest-xray-pneumonia (accessed 01 October, 2021).

[117] D. Kermany, "Identifying medical diagnoses and treatable diseases by image-based deep learning. Cell 172, 1122–1131 (2018)," *Scientific Reports,* vol. 11, p. 18005, 2021.

[118] T. Rahman *et al.*, "Reliable tuberculosis detection using chest X-ray with deep learning, segmentation and visualization," *IEEE Access,* vol. 8, pp. 191586-191601, 2020.

[119] S. S. Skandha *et al.*, "3-D optimized classification and characterization artificial intelligence paradigm for cardiovascular/stroke risk stratification using carotid ultrasound-based delineated plaque: Atheromatic™ 2.0," *Computers in Biology and Medicine,* vol. 125, p. 103958, 2020.

[120] L. Saba *et al.*, "Ultrasound-based internal carotid artery plaque characterization using deep learning paradigm on a supercomputer: a cardiovascular disease/stroke risk assessment system," *The International Journal of Cardiovascular Imaging,* vol. 37, pp. 1511-1528, 2021.

[121] "Face95; Libor Spacek's Facial Images Databases." https://cmp.felk.cvut.cz/~spacelib/faces/faces95.html (accessed 10 October, 2021).

[122] C. Peng *et al.*, "Learning discriminative representation for image classification," *Knowledge-based systems,* vol. 233, p. 107517, 2021.

[123] C. Zhang *et al.*, "Resnet or densenet? introducing dense shortcuts to resnet," in *Proceedings of the IEEE/CVF winter conference on applications of computer vision*, 2021, pp. 3550-3559.

[124] K. Zhang, Y. Guo, X. Wang, J. Yuan, and Q. Ding, "Multiple feature reweight densenet for image classification," *IEEE Access,* vol. 7, pp. 9872-9880, 2019.

[125] P. Sudeep *et al.*, "Speckle reduction in medical ultrasound images using an unbiased non-local means method," *Biomedical Signal Processing and Control,* vol. 28, pp. 1-8, 2016.

[126] S. S. Sanagala *et al.*, "Ten fast transfer learning models for carotid ultrasound plaque tissue characterization in augmentation framework embedded with heatmaps for stroke risk stratification," *Diagnostics,* vol. 11, no. 11, p. 2109, 2021.

[127] W. Kusakunniran *et al.*, "COVID-19 detection and heatmap generation in chest x-ray images," *Journal of Medical Imaging,* vol. 8, no. S1, pp. 014001-014001, 2021.

[128] S. Liang *et al.*, "Fast automated detection of COVID-19 from medical images using convolutional neural networks," *Communications Biology,* vol. 4, no. 1, p. 35, 2021.

[129] V. Kuppili *et al.*, "Extreme learning machine framework for risk stratification of fatty liver disease using ultrasound tissue characterization," *Journal of medical systems,* vol. 41, pp. 1-20, 2017.

[130] Y. He, X. Zhang, and J. Sun, "Channel pruning for accelerating very deep neural networks," in *Proceedings of the IEEE international conference on computer vision*, 2017, pp. 1389-1397.

[131] A. P. Adedigba, S. A. Adeshina, O. E. Aina, and A. M. Aibinu, "Optimal hyperparameter selection of deep learning models for COVID-19 chest X-ray classification," *Intelligence-based medicine,* vol. 5, p. 100034, 2021.

[132] M. Zandehshahvar, M. van Assen, H. Maleki, Y. Kiarashi, C. N. De Cecco, and A. Adibi, "Toward understanding COVID-19 pneumonia: A deep-learning-based approach for severity analysis and monitoring the disease," *Scientific Reports,* vol. 11, no. 1, p. 11112, 2021.

[133] A. El-Baz, G. Gimel'farb, and J. S. Suri, *Stochastic modeling for medical image analysis*. CRC Press, 2015.

[134] J. Yanase and E. Triantaphyllou, "A systematic survey of computer-aided diagnosis in medicine: Past and present developments," *Expert Systems with Applications,* vol. 138, p. 112821, 2019.

[135] M. Singh, V. Venkatesh, A. Verma, and N. Sharma, "Segmentation of MRI data using multi-objective antlion based improved fuzzy c-means," *Biocybernetics and Biomedical Engineering,* vol. 40, no. 3, pp. 1250-1266, 2020.

[136] P. K. Jain, N. Sharma, M. K. Kalra, A. Johri, L. Saba, and J. S. Suri, "Far wall plaque segmentation and area measurement in common and internal carotid artery ultrasound using U-series architectures: An unseen Artificial Intelligence paradigm for stroke risk assessment," *Computers in Biology and Medicine,* vol. 149, p. 106017, 2022.

[137] A. Lin *et al.*, "Deep learning-enabled coronary CT angiography for plaque and stenosis quantification and cardiac risk prediction: an international multicentre study," *The Lancet Digital Health,* vol. 4, no. 4, pp. e256-e265, 2022.

[138] M. Biswas and J. S. Suri, "A systematic review of conventional and deep learning models for the measurement of plaque burden," *Multimodality Imaging, Volume 1: Deep learning applications,* 2022.

[139] R. Kumar *et al.*, "Classification of COVID-19 from chest x-ray images using deep features and correlation coefficient," *Multimedia Tools and Applications,* vol. 81, no. 19, pp. 27631-27655, 2022.

[140] R. Kumar *et al.*, "Accurate prediction of COVID-19 using chest X-ray images through deep feature learning model with SMOTE and machine learning classifiers," *MedRxiv,* p. 2020.04. 13.20063461, 2020.

[141] R. Arora *et al.*, "AI-based diagnosis of COVID-19 patients using X-ray scans with stochastic ensemble of CNNs," *Physical and Engineering Sciences in Medicine,* vol. 44, pp. 1257-1271, 2021.

[142] M. Tanveer, A. H. Rashid, R. Kumar, and R. Balasubramanian, "Parkinson's disease diagnosis using neural networks: Survey and comprehensive evaluation," *Information Processing & Management,* vol. 59, no. 3, p. 102909, 2022.

[143] C. Yan, R. Hui, Z. Lijuan, and Y. Zhou, "Lung ultrasound vs. chest X-ray in children with suspected pneumonia confirmed by chest computed tomography: A retrospective cohort study," *Experimental and Therapeutic Medicine,* vol. 19, no. 2, pp. 1363-1369, 2020.

[144] M. O. Wielpütz, C. P. Heußel, F. J. Herth, and H.-U. Kauczor, "Radiological diagnosis in lung disease: factoring treatment options into the choice of diagnostic modality," *Deutsches Ärzteblatt International,* vol. 111, no. 11, p. 181, 2014.

[145] M. Ilyas, H. Rehman, and A. Naït-Ali, "Detection of covid-19 from chest x-ray images using artificial intelligence: An early review," *arXiv preprint arXiv:2004.05436,* 2020.

[146] C. Wang, Z. Xu, H. Liu, Y. Wang, J. Wang, and R. Tai, "Background noise removal in x-ray ptychography," *Applied optics,* vol. 56, no. 8, pp. 2099-2111, 2017.

[147] S. Candemir *et al.*, "Lung segmentation in chest radiographs using anatomical atlases with nonrigid registration," *IEEE transactions on medical imaging,* vol. 33, no. 2, pp. 577-590, 2013.

[148] W. Liu, J. Luo, Y. Yang, W. Wang, J. Deng, and L. Yu, "Automatic lung segmentation in chest X-ray images using improved U-Net," *Scientific Reports,* vol. 12, no. 1, p. 8649, 2022.

[149] T. B. Chandra, B. K. Singh, and D. Jain, "Disease localization and severity assessment in chest x-ray images using multi-stage superpixels classification," *Computer Methods and Programs in Biomedicine,* vol. 222, p. 106947, 2022.

[150] T. B. Chandra, K. Verma, D. Jain, and S. S. Netam, "Segmented lung boundary correction in chest radiograph using context-aware adaptive scan algorithm," in *Advances in Biomedical Engineering and Technology: Select Proceedings of ICBEST 2018*, 2021: Springer, pp. 263-275.

[151] N. Pandey. "Chest X-ray Masks and Labels." https://www.kaggle.com/datasets/nikhilpandey360/chest-xray-masks-and-labels (accessed 08 January, 2022).

[152] O. Ronneberger, P. Fischer, and T. Brox, "U-net: Convolutional networks for biomedical image segmentation," in *Medical Image Computing and Computer-Assisted Intervention–MICCAI 2015: 18th International Conference, Munich, Germany, October 5-9, 2015, Proceedings, Part III 18*, 2015: Springer, pp. 234-241.

[153] M. D. Zeiler, D. Krishnan, G. W. Taylor, and R. Fergus, "Deconvolutional networks," in *2010 IEEE Computer Society Conference on computer vision and pattern recognition*, 2010: IEEE, pp. 2528-2535.

[154] H. Chen, H. Lin, and M. Yao, "Improving the efficiency of encoder-decoder architecture for pixel-level crack detection," *IEEE Access,* vol. 7, pp. 186657-186670, 2019.

[155] Nillmani *et al.*, "Segmentation-Based Classification Deep Learning Model Embedded with Explainable AI for COVID-19 Detection in Chest X-ray Scans," *Diagnostics,* vol. 12, no. 9, p. 2132, 2022. [Online]. Available: https://www.mdpi.com/2075-4418/12/9/2132.

[156] M. A. Islam, S. Kundu, S. S. Alam, T. Hossan, M. A. Kamal, and R. Hassan, "Prevalence and characteristics of fever in adult and paediatric patients with coronavirus disease 2019 (COVID-19): A systematic review and meta-analysis of 17515 patients," *PloS one,* vol. 16, no. 4, p. e0249788, 2021.

[157] "World Health Organization." https://covid19.who.int/ (accessed 28 April, 2023).

[158] C. f. D. C. a. prevention. "Long COVID or Post-COVID Conditions." https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects/index.html#:~:text=Some%20people%2C%20especially%20those%20who,kidney%2C%20skin%2C%20and%20brain. (accessed 17 March, 2022).

[159] N. Heptonstall, T. Ali, and K. Mankad, "Integrating radiology and anatomy teaching in medical education in the UK—the evidence, current trends, and future scope," *Academic Radiology,* vol. 23, no. 4, pp. 521-526, 2016.

[160] S. Bickelhaupt *et al.*, "Fast and noninvasive characterization of suspicious lesions detected at breast cancer X-ray screening: capability of diffusion-weighted MR imaging with MIPs," *Radiology,* vol. 278, no. 3, pp. 689-697, 2016.

[161] L. Saba and J. S. Suri, *Multi-detector CT imaging: abdomen, pelvis, and CAD applications*. CRC Press, 2013.

[162] S. Liu *et al.*, "Deep learning in medical ultrasound analysis: a review," *Engineering,* vol. 5, no. 2, pp. 261-275, 2019.

[163] A. S. Panayides *et al.*, "AI in medical imaging informatics: current challenges and future directions," *IEEE journal of biomedical and health informatics,* vol. 24, no. 7, pp. 1837-1857, 2020.

[164] S. K. Zhou *et al.*, "A review of deep learning in medical imaging: Imaging traits, technology trends, case studies with progress highlights, and future promises," *Proceedings of the IEEE,* vol. 109, no. 5, pp. 820-838, 2021.

[165] Y. Zhou, C. Koyuncu, G. Corredor, X. Wang, C. Lu, and A. Madabhushi, "Transformer as a spatially-aware multi-instance learning framework to predict the risk of death for early-stage non-

small cell lung cancer," in *Medical Imaging 2023: Digital and Computational Pathology*, 2023, vol. 12471: SPIE, pp. 207-215.

[166] K. Munir, H. Elahi, A. Ayub, F. Frezza, and A. Rizzi, "Cancer diagnosis using deep learning: a bibliographic review," *Cancers,* vol. 11, no. 9, p. 1235, 2019.

[167] A. Echle, N. T. Rindtorff, T. J. Brinker, T. Luedde, A. T. Pearson, and J. N. Kather, "Deep learning in cancer pathology: a new generation of clinical biomarkers," *British journal of cancer,* vol. 124, no. 4, pp. 686-696, 2021.

[168] J. Manhas, R. K. Gupta, and P. P. Roy, "A review on automated cancer detection in medical images using machine learning and deep learning based computational techniques: Challenges and opportunities," *Archives of Computational Methods in Engineering,* pp. 1-41, 2021.

[169] M. Agarwal *et al.*, "A novel block imaging technique using nine artificial intelligence models for COVID-19 disease classification, characterization and severity measurement in lung computed tomography scans on an Italian cohort," *Journal of Medical Systems,* vol. 45, pp. 1-30, 2021.

[170] L. Saba *et al.*, "Six artificial intelligence paradigms for tissue characterisation and classification of non-COVID-19 pneumonia against COVID-19 pneumonia in computed tomography lungs," *International journal of computer assisted radiology and surgery,* vol. 16, pp. 423-434, 2021.

[171] C. Shorten, T. M. Khoshgoftaar, and B. Furht, "Deep Learning applications for COVID-19," *Journal of big Data,* vol. 8, no. 1, pp. 1-54, 2021.

[172] C. Ouchicha, O. Ammor, and M. Meknassi, "CVDNet: A novel deep learning architecture for detection of coronavirus (Covid-19) from chest x-ray images," *Chaos, Solitons & Fractals,* vol. 140, p. 110245, 2020.

[173] X. Zhang *et al.*, "Diagnosis of COVID-19 pneumonia via a novel deep learning architecture," *Journal of computer science and technology,* vol. 37, no. 2, pp. 330-343, 2022.

[174] N. Aisu *et al.*, "Regulatory-approved deep learning/machine learning-based medical devices in Japan as of 2020: A systematic review," *PLOS Digital Health,* vol. 1, no. 1, p. e0000001, 2022.

[175] X.-X. Yin, L. Sun, Y. Fu, R. Lu, and Y. Zhang, "U-Net-Based medical image segmentation," *Journal of Healthcare Engineering,* vol. 2022, 2022.

[176] M. Mirmehdi, *Handbook of texture analysis*. Imperial College Press, 2008.

[177] M. Agarwal *et al.*, "Eight pruning deep learning models for low storage and high-speed COVID-19 computed tomography lung segmentation and heatmap-based lesion localization: A multicenter study using COVLIAS 2.0," *Computers in biology and medicine,* vol. 146, p. 105571, 2022.

[178] L. Saba *et al.*, "Inter-observer variability analysis of automatic lung delineation in normal and disease patients," *Journal of medical systems,* vol. 40, pp. 1-18, 2016.

[179] R. Cau *et al.*, "Long-COVID diagnosis: From diagnostic to advanced AI-driven models," *European journal of radiology,* vol. 148, p. 110164, 2022.

[180] J. S. Suri, K. Liu, L. Reden, and S. Laxminarayan, "A review on MR vascular image processing algorithms: acquisition and prefiltering: part I," *IEEE transactions on information technology in biomedicine: a publication of the IEEE Engineering in Medicine and Biology Society,* vol. 6, no. 4, pp. 324-337, 2002.

[181] M. Singh, A. Verma, and N. Sharma, "Multi-objective noise estimator for the applications of de-noising and segmentation of MRI data," *Biomedical Signal Processing and Control,* vol. 46, pp. 249-259, 2018.

[182] S. V. M. Sagheer and S. N. George, "A review on medical image denoising algorithms," *Biomedical signal processing and control,* vol. 61, p. 102036, 2020.

[183] M. F. Aslan, K. Sabanci, and E. Ropelewska, "A new approach to COVID-19 detection: an ANN proposal optimized through tree-seed algorithm," *Symmetry,* vol. 14, no. 7, p. 1310, 2022.

[184] M. F. Aslan, M. F. Unlersen, K. Sabanci, and A. Durdu, "CNN-based transfer learning–BiLSTM network: A novel approach for COVID-19 infection detection," *Applied Soft Computing,* vol. 98, p. 106912, 2021.
[185] V. Jain, R. Vashisht, G. Yilmaz, and A. Bhardwaj, "Pneumonia pathology," 2018.
[186] M. H. Ebell, H. Chupp, X. Cai, M. Bentivegna, and M. Kearney, "Accuracy of Signs and Symptoms for the Diagnosis of Community-acquired Pneumonia: A Meta-analysis," *Academic Emergency Medicine,* vol. 27, no. 7, pp. 541-553, 2020.
[187] H. Farooqui, M. Jit, D. L. Heymann, and S. Zodpey, "Burden of severe pneumonia, pneumococcal pneumonia and pneumonia deaths in Indian states: modelling based estimates," *PloS one,* vol. 10, no. 6, p. e0129191, 2015.
[188] T. Wardlaw, P. Salama, E. W. Johansson, and E. Mason, "Pneumonia: the leading killer of children," *The Lancet,* vol. 368, no. 9541, pp. 1048-1050, 2006.
[189] V. Singh and S. Aneja, "Pneumonia–management in the developing world," *Paediatric respiratory reviews,* vol. 12, no. 1, pp. 52-59, 2011.
[190] D. M. Weinberger *et al.*, "Estimation of excess deaths associated with the COVID-19 pandemic in the United States, March to May 2020," *JAMA internal medicine,* vol. 180, no. 10, pp. 1336-1344, 2020.
[191] A. A. Rabaan *et al.*, "Viral dynamics and real-time RT-PCR Ct values correlation with disease severity in COVID-19," *Diagnostics,* vol. 11, no. 6, p. 1091, 2021.
[192] L. Peñarrubia *et al.*, "Multiple assays in a real-time RT-PCR SARS-CoV-2 panel can mitigate the risk of loss of sensitivity by new genomic variants during the COVID-19 outbreak," *International journal of infectious diseases,* vol. 97, pp. 225-229, 2020.
[193] S. A. Bustin and R. Mueller, "Real-time reverse transcription PCR (qRT-PCR) and its potential use in clinical diagnosis," *Clinical Science,* vol. 109, no. 4, pp. 365-379, 2005.
[194] I. Arevalo-Rodriguez *et al.*, "False-negative results of initial RT-PCR assays for COVID-19: a systematic review," *PloS one,* vol. 15, no. 12, p. e0242958, 2020.
[195] P. Karadbhajane *et al.*, "A Review of Challenges in Performing RT-PCR for COVID-19 in Rural Healthcare Settings," *Journal of Pharmaceutical Research International,* vol. 33, no. 60B, pp. 845-853, 2021.
[196] G. I. P. Perez and A. T. B. Abadi, "Ongoing challenges faced in the global control of COVID-19 pandemic," *Archives of medical research,* vol. 51, no. 6, pp. 574-576, 2020.
[197] T. D'Angelo *et al.*, "Dual energy computed tomography virtual monoenergetic imaging: technique and clinical applications," *The British journal of radiology,* vol. 92, no. 1098, p. 20180546, 2019.
[198] S. C. Kheruka, L. M. Aggarwal, N. Sharma, U. C. Naithani, A. K. Maurya, and S. Gambhir, "Evaluation of single-photon emission computed tomography images obtained with and without copper filter by segmentation," *Indian journal of nuclear medicine: IJNM: the official journal of the Society of Nuclear Medicine, India,* vol. 31, no. 2, p. 114, 2016.
[199] A. Kaur *et al.*, "Quantitative liver SPECT/CT is a novel tool to assess liver function, prognosis, and response to treatment in cirrhosis," *Frontiers in Medicine,* vol. 10, p. 501, 2023.
[200] M. U. Nasir *et al.*, "The role of emergency radiology in COVID-19: from preparedness to diagnosis," *Canadian Association of Radiologists Journal,* vol. 71, no. 3, pp. 293-300, 2020.
[201] W. E. Brant and C. A. Helms, "Fundamentals of diagnostic radiology," 2012.
[202] E. R. Long and W. H. Stearns, "Physical examination at induction: standards with respect to tuberculosis and their application as illustrated by a review of 53,400 X-ray films of men in the Army of the United States," *Radiology,* vol. 41, no. 2, pp. 144-150, 1943.
[203] A. Jacobi, M. Chung, A. Bernheim, and C. Eber, "Portable chest X-ray in coronavirus disease-19 (COVID-19): A pictorial review," *Clinical imaging,* vol. 64, pp. 35-42, 2020.

[204] E. Benmalek, J. Elmhamdi, and A. Jilbab, "Comparing CT scan and chest X-ray imaging for COVID-19 diagnosis," *Biomedical Engineering Advances,* vol. 1, p. 100003, 2021.

[205] S. C. Kheruka, N. Shankar, M. Ora, and S. Gambhir, "Do current radiation safety guidelines allow the safe release of a thyroid cancer patient after high-dose radioiodine therapy? An Indian perspective," *Indian Journal of Nuclear Medicine: IJNM: The Official Journal of the Society of Nuclear Medicine, India,* vol. 36, no. 2, p. 148, 2021.

[206] T. Kaur, B. S. Saini, and S. Gupta, "An adaptive fuzzy K-nearest neighbor approach for MR brain tumor image classification using parameter free bat optimization algorithm," *Multimedia Tools and Applications,* vol. 78, pp. 21853-21890, 2019.

[207] K. Dutta *et al.*, "Deep learning segmentation of triple-negative breast cancer (TNBC) patient derived tumor xenograft (PDX) and sensitivity of radiomic pipeline to tumor probability boundary," *Cancers,* vol. 13, no. 15, p. 3795, 2021.

[208] B. T. Flannery, P. Lal, M. D. Feldman, M. Natalizio, J. C. Santa-Rosario, and A. Madabhushi, "Biopsy and surgical specimen specific deep learning models for prostate cancer detection on digitized pathology images," in *Medical Imaging 2023: Digital and Computational Pathology*, 2023, vol. 12471: SPIE, pp. 107-115.

[209] A. K. Verma, I. Saini, and B. S. Saini, "A new bat optimization algorithm based feature selection method for electrocardiogram heartbeat classification using empirical wavelet transform and fisher ratio," *International Journal of Machine Learning and Cybernetics,* vol. 11, pp. 2439-2452, 2020.

[210] F. Chollet, "Xception: Deep learning with depthwise separable convolutions," in *Proceedings of the IEEE conference on computer vision and pattern recognition*, 2017, pp. 1251-1258.

[211] Y. Zhou, X. Kang, and F. Ren, "Employing Inception-Resnet-v2 and Bi-LSTM for Medical Domain Visual Question Answering," in *CLEF (working notes)*, 2018.

[212] M. F. Hashmi, S. Katiyar, A. G. Keskar, N. D. Bokde, and Z. W. Geem, "Efficient pneumonia detection in chest xray images using deep transfer learning," *Diagnostics,* vol. 10, no. 6, p. 417, 2020.

[213] V. Chouhan *et al.*, "A novel transfer learning based approach for pneumonia detection in chest X-ray images," *Applied Sciences,* vol. 10, no. 2, p. 559, 2020.

[214] A. Pant, A. Jain, K. C. Nayak, D. Gandhi, and B. Prasad, "Pneumonia detection: An efficient approach using deep learning," in *2020 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT)*, 2020: IEEE, pp. 1-6.

[215] A. K. Das, S. Ghosh, S. Thunder, R. Dutta, S. Agarwal, and A. Chakrabarti, "Automatic COVID-19 detection from X-ray images using ensemble learning with convolutional neural network," *Pattern Analysis and Applications,* vol. 24, pp. 1111-1124, 2021.

[216] M. Shorfuzzaman, M. Masud, H. Alhumyani, D. Anand, and A. Singh, "Artificial neural network-based deep learning model for COVID-19 patient detection using X-ray chest images," *Journal of Healthcare Engineering,* vol. 2021, pp. 1-16, 2021.

[217] F. Ahmad, A. Farooq, and M. U. Ghani, "Deep ensemble model for classification of novel coronavirus in chest X-ray images," *Computational intelligence and neuroscience,* vol. 2021, 2021.

[218] R. Kundu, R. Das, Z. W. Geem, G.-T. Han, and R. Sarkar, "Pneumonia detection in chest X-ray images using an ensemble of deep learning models," *PloS one,* vol. 16, no. 9, p. e0256630, 2021.

[219] E. Ayan, B. Karabulut, and H. M. Ünver, "Diagnosis of pediatric pneumonia with ensemble of deep convolutional neural networks in chest x-ray images," *Arabian Journal for Science and Engineering,* pp. 1-17, 2022.

[220] M. Badar, M. Haris, and A. Fatima, "Application of deep learning for retinal image analysis: A review," *Computer Science Review,* vol. 35, p. 100203, 2020.

[221] R. Poplin *et al.*, "Prediction of cardiovascular risk factors from retinal fundus photographs via deep learning," *Nature biomedical engineering,* vol. 2, no. 3, pp. 158-164, 2018.
[222] R. Kumar, B. Singh, H. Singh, and A. Watts, "Radiotheranostics Practice in India-Advancing to Precision Oncology," *Indian Journal of Nuclear Medicine,* vol. 37, no. 5, p. 13, 2022.
[223] C. Caudai *et al.*, "AI applications in functional genomics," *Computational and Structural Biotechnology Journal,* vol. 19, pp. 5762-5790, 2021.
[224] J. Xu *et al.*, "Translating cancer genomics into precision medicine with artificial intelligence: applications, challenges and future perspectives," *Human genetics,* vol. 138, no. 2, pp. 109-124, 2019.
[225] G. Eraslan, Ž. Avsec, J. Gagneur, and F. J. Theis, "Deep learning: new computational modelling techniques for genomics," *Nature Reviews Genetics,* vol. 20, no. 7, pp. 389-403, 2019.
[226] A. Glielmo, B. E. Husic, A. Rodriguez, C. Clementi, F. Noé, and A. Laio, "Unsupervised learning methods for molecular simulation data," *Chemical Reviews,* vol. 121, no. 16, pp. 9722-9758, 2021.

Author's List of Publications during Ph.D. Work

The materials in this thesis consist of papers already published or submitted to fully refereed international journals or conferences. Some works from publications have been omitted as they do not thematically fit into the thesis. The bibliographical details of the work and where it appears in the thesis are outlined below.

1) Nillmani; Jain, P.K.; Sharma, N.; Kalra, M.K.; Viskovic, K.; Saba, L.; Suri, J.S. "Four Types of Multiclass Frameworks for Pneumonia Classification and Its Validation in X-ray Scans Using Seven Types of Deep Learning Artificial Intelligence Models." *Diagnostics* 2022, *12*, 652. https://doi.org/10.3390/diagnostics12030652. (Chapter 2)

2) Nillmani; Sharma, N.; Saba, L.; Khanna, N.N.; Kalra, M.K.; Fouda, M.M.; Suri, J.S. "Segmentation-Based Classification Deep Learning Model Embedded with Explainable AI for COVID-19 Detection in Chest X-ray Scans." *Diagnostics* 2022, *12*, 2132. https://doi.org/10.3390/diagnostics12092132. (Chapters 3 and 4)

3) Nillmani; Sharma, N.; "A Deep Learning Approach for Rapid and Precise Detection of COVID-19 in Chest radiographs". IEEE International Conference on Communication, Security and Artificial Intelligence, ICCSAI-2022; IEEE Xplore. (Chapter 4)

4) Nillmani; Sharma, N.; "An Artificial Intelligence-Driven Deep Learning Model for Chest X-ray Image Segmentation, Second International Conference on Biomedical Engineering Science and Technology; Roadway from Laboratory to Market," ICBEST 2023; Springer Proceedings. (Chapter 3)

5) Nillmani; Sharma, N.; Jain, P.K.; Roy, S.; "Artificial Intelligence Driven Deep Learning Models for Pneumonia Detection in Chest X-ray." Submitted in International Journal of Cognitive Computing in Engineering, Elsevier, 2023: under review. (Chapter 4)

6) Nillmani et al.; "Quantitative and Qualitative Impact of Deep Neural Networks on Ensemble Models for Improved Performance for COVID-19 Detection Using Chest X-ray Images" Submitted in IEEE/ACM Transactions on Computational Biology and Bioinformatics, 2023; under review. (Chapter 5)

7) Vinayak Sharma, Nillmani, Sachin Kumar Gupta, Kaushal Kumar Shukla, Deep learning models for tuberculosis detection and infected region visualization in chest X-ray images, Intelligent Medicine, 2023, ISSN 2667-1026, https://doi.org/10.1016/j.imed.2023.06.001. (https://www.sciencedirect.com/science/article/pii/S2667102623000438)

8) Dubey, A.K.; Chabert, G.L.; Carriero, A.; Pasche, A.; Danna, P.S.C.; Agarwal, S.; Mohanty, L.; Nillmani; Sharma, N.; Yadav, S.; et al. Ensemble Deep Learning Derived from Transfer Learning for Classification of COVID-19 Patients on Hybrid Deep-Learning-Based Lung Segmentation: A Data Augmentation and Balancing Framework. *Diagnostics* **2023**, *13*, 1954. https://doi.org/10.3390/diagnostics13111954