Detection of Melanoma Skin Cancer Disease using AI based Approaches for Medical Image Processing - A Study

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Abstract: *Malignant melanoma, often known as melanoma, is a form of skin cancer that occurs when melanocyte cells that have been harmed by prolonged exposure to UV radiation begin to grow uncontrollably. Although less frequent than certain other types of skin cancer, it is more hazardous because, if not identified and treated at its earliest stages, it quickly metastasizes. Due to their challenging and subjective human interpretation and extremely complex and expensive diagnosis, dermatological diseases rank among the most serious medical problems of the twenty-first century. When it comes to lethal illnesses like melanoma, early detection is crucial for assessing the likelihood of recovery. We think the use of automated approaches will aid in early diagnosis, particularly when a batch of photos has a variety of diagnoses. Therefore, in contrast to traditional medical personnel-based detection, an effort is made to list out the feasible approaches that are already defined to identify the melanoma skin disease. This study on various existing approaches will provide insights on the technologies available in the current era to identify this deadliest disease at the earliest possible time.*

Keywords: Melanoma, Malignant, Skin Cancer, Image Processing.

REFERENCES

[1] Banerjee, S., Singh, S. K., Chakraborty, A., Das, A., & Bag, R. (2020). Melanoma Diagnosis Using Deep Learning and Fuzzy Logic. *Diagnostics (Basel, Switzerland)*, *10*(8), 577. https://doi.org/10.3390/diagnostics10080577

[2] M. Julie Therese, A. Devi, G. Kavya (2021) Melanoma Detection on Skin Lesion Images Using K-Means Algorithm and Svm Classifier, Handbook of Deep Learning in Biomedical Engineering and Health Informatics, 1st Edition, Pages 344, Taylor & Francis Group, Apple Academic Press, eBook ISBN9781003144694, https://doi.org/10.1201/9781003144694

[3] KritikaSujay Rao, Pooja Suresh Yelkar, Omkar Narayan Pise, Dr. SwapnaBorde, 2021, Skin Disease Detection using Machine Learning, International Journal of Engineering Research & Technology (IJERT) NTASU – 2020, Volume 09, Issue 03, ISSN: 2278-0181, DOI: 10.17577/IJERTCONV9IS03016

[4] Arjun K P and K. Sampath Kumar, Classification of Skin Melanoma Using Neural Network to Discover an Optimal Solution for Imbalanced Dataset, Tianjin DaxueXuebao (ZiranKexueyuGongchengJishu Ban)/ Journal of Tianjin University Science and Technology ISSN 0493-2137, Vol 54 Issue 07, 2021 DOI 10.17605/OSF.IO/THJE9

[5] Vijayalakshmi M M "Melanoma Skin Cancer Detection using Image Processing and Machine Learning" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-3 | Issue-4, June 2019, pp.780-784, URL: https://www.ijtsrd.com/papers/ijtsrd23936.pdf

[6] Pallavi, B &Keshvamurthy (2019). A Hybrid Diagnosis System for Malignant Melanoma Detection in Dermoscopic Images. 1471-1476. 10.1109/RTEICT46194.2019.9016745.

[7] Alwakid, G., Gouda, W., Humayun, M., &Sama, N. U. (2022). Melanoma Detection Using Deep Learning-Based Classifications. Healthcare (Basel, Switzerland), 10(12), 2481. https://doi.org/10.3390/healthcare10122481

[8] Reshma G., Al-Atroshi C., Nassa V.K., Geetha B., Sunitha G., Galety M.G., Neelakandan S. (2022) Deep Learning-Based Skin Lesion Diagnosis Model Using Dermoscopic Images. Intell. Autom. Soft Comput. 2022, 31, 621–634. doi: 10.32604/iasc.2022.019117.

[9] Vatekar, Prof &Phapale, Sakshi&Bhor, Akshada& Patel, Chirag &Tiwary, Ayush. (2023). Skin Cancer Prediction using Deep Learning. International Journal of Advanced Research in Science, Communication and Technology. 570-574. 10.48175/IJARSCT-8541.

[10] Aldwgeri, Ather&Abubacker, Nirase. (2019). Ensemble of Deep Convolutional Neural Network for Skin Lesion Classification in Dermoscopy Images. 10.1007/978-3-030-34032-2_20.

[11] Reis, H. C., Turk, V., Khoshelham, K., & Kaya, S. (2022). InSiNet: a deep convolutional approach to skin cancer detection and segmentation. Medical & Biological Engineering & Computing, 1-20. https://doi.org/10.1007/s11517-021-02473-0

[12] Rajput, G., Agrawal, S., Raut, G., &Vishvakarma, S. K. (2022). An accurate and noninvasive skin cancer screening based on imaging technique. International Journal of Imaging Systems and Technology, 32(1), 354-368.

[13] Thapar, P., Rakhra, M., Cazzato, G., & Hossain, M. S. (2022). A Novel Hybrid Deep Learning Approach for Skin Lesion Segmentation and Classification. Journal of healthcare engineering, 2022, 1709842. https://doi.org/10.1155/2022/1709842 (Retraction published J Healthc Eng. 2023 May 24;2023:9832712)

[14] Ragab M, Choudhry H, Al-Rabia MW, Binyamin SS, Aldarmahi AA and Mansour RF (2022) Early and accurate detection of melanoma skin cancer using hybrid level set approach. *Front. Physiol.* 13:965630. doi: 10.3389/fphys.2022.965630

[15] Nawaz, M., Mehmood, Z., Nazir, T., Naqvi, R. A., Rehman, A., Iqbal, M., & Saba, T. (2022). Skin cancer detection from dermoscopic images using deep learning and fuzzy k-means clustering. Microscopy Research and Technique, 85(1), 339– 351.https://doi.org/10.1002/jemt.23908