Pixel Based Multi Class Skin Cancer Classification using Convolutional Neural Network

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Abstract: *Skin cancer poses a significant societal concern, as pigments responsible for skin colour can become carcinogenic, leading to the development of the disease. Detecting lesions early is vital for effective skin cancer treatment, yet diagnosis is challenging due to the similarity of many pigments. To aid dermatologists, substantial advancements have been achieved in developing automated tools utilizing artificial intelligence. One notable tool is a Computer-Aided Diagnosis (CAD) system employing a Convolutional Neural Network (CNN) to classify seven types of skin cancer from atypical lesion images.*

In recent years, there has been significant progress in the development of automated cancer classification systems utilizing deep learning techniques. However, these systems often exhibit bias towards fair skin tones due to datasets skewed towards lighter skin complexions. This project addresses this challenge by proposing a model comparing among Convolution Neural Network and Multi - Layer Perceptron deep learning architecture specifically designed for fair skin cancer classification. The proposed model incorporates with a pre - trained model on an imbalanced pixel dataset to mitigate bias on skin colour and improve classification accuracy for fair skin cancers. The model is evaluated on a HAM10000 pixel dataset for fair skin cancer classification, demonstrating competitive performance while promoting fairness in cancer diagnosis using minimal resources..

Keywords: Skin cancer classification, Convolutional Neural Network (CNN), Multi – Layer Perceptron, Pixels, Image Classification

REFERENCES

[1] Naqvi, M.; Gilani, S.Q.; Syed, T.; Marques, O.; Kim, H.-C. Skin Cancer Detection Using Deep Learning—A Review. Diagnostics 2023, 13, 1911. https://doi.org/ 10.3390/diagnostics13111911

[2] Mishra S, Imaizumi H, Yamasaki T. Interpreting Fine-Grained Dermatological Classification by Deep Learning. *Proc IEEE/CVF Conf Comput Vision Pattern Recognit Workshops* (2019), 0–0. doi: 10.1109/CVPRW.2019.00331

[3] Esteva A, Kuprel B, Novoa RA, Ko J, Swetter SM, Blau HM, et al. Dermatologist-Level Classification of Skin Cancer with Deep Neural Networks. *Nature* (2017) 542:115–8. doi: 10.1038/nature21056

[4] Lopez AR, Giro-i Nieto X, Burdick J, Marques O. Skin Lesion Classification from Dermoscopic Images Using Deep Learning Techniques, in: 13th IASTED International Conference on Biomedical Engineering (BioMed), Manhattan, New York, U.S: Institute of Electrical and Electronics Engineers (IEEE) (2017). pp. 49–54.

[5] Walker B, Rehg J, Kalra A, Winters R, Drews P, Dascalu J, et al. Dermoscopy Diagnosis of Cancerous Lesions Utilizing Dual Deep Learning Algorithms via Visual and Audio (Sonification) Outputs: Laboratory and Prospective Observational Studies. *EBioMedicine* (2019) 40:176–83. doi: 10.1016/j.ebiom.2019.01.028

[6] Perez F, Avila S, Valle E. Solo or Ensemble? Choosing a CNN Architecture for Melanoma Classification. *Proc IEEE/CVF Conf Comput Vision Pattern Recognit Workshops* (2019), 0–0. doi: 10.1109/CVPRW.2019.00336

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[7] Polat K, Koc KO. Detection of Skin Diseases From Dermoscopy Image Using the Combination of Convolutional Neural Network and One-Versus-All. *J Artif Intell Syst* (2020) 2:80–97. doi: 10.33969/AIS.2020.21006

[8] Rahman Z, Hossain MS, Islam MR, Hasan MM, Hridhee RA. An Approach for Multiclass Skin Lesion Classification Based on Ensemble Learning. *Inf Med Unlocked* (2021) 25:100659. doi: 10.1016/j.imu.2021.100659

[9] Kawahara J, Daneshvar S, Argenziano G, Hamarneh G. Seven-Point Checklist and Skin Lesion Classification Using Multitask Multimodal Neural Nets. *IEEE J Biomed Health Inf* (2019) 23:538–46. doi: 10.1109/JBHI.2018.2824327

[10] Hameed N, Shabut A, Hameed F, Cirstea S, Harriet S, Hossain A. Mobile Based Skin Lesions Classification Using Convolution Neural Network. *Ann Emerging Technol Comput (AETiC)* (2020) 4:26–37. doi: 10.33166/AETiC.2020.02.003

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