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Survey on Skin Disease Detection Using Machine Learning and Image Processing

[1]Akash Dodke, [2]Swapnil Roman, [3]Sagar Khatik, [4]Vishnuprasad Kenche, [5]Avinash Jadhao

[1]Professor, APCOER, Pune
[2,3,4,5]Student, APCOER, Pune

ABSTRACT—

Skin illness is the most common sickness on the planet. When diagnosing skin disorders, dermatologists must have a high level of competence and accuracy, so a computer-aided skin disease diagnosis model is presented as a more objective and reliable solution. Much research has been carried out to aid in the diagnosis of skin diseases such as skin cancer and tumors. However, due to factors such as low contrast between lesions and skin, visual similarity between the Disease and non Disease parts, and so on, correct disease recognition is highly difficult. This study aims to detect skin disease from a skin image and analyze it by applying a filter to remove noise and unwanted items, changing the image to grey to aid processing, and extracting useful information. This can be used to indicate emergency preparedness and provide proof of any type of skin disease.

Index Terms: Deep learning, CNN, facial skin disease, medical image processing

Introduction

The most frequent ailment on the world is skin disease. Dermatologists must have a high level of skill and accuracy when diagnosing skin diseases; hence a computer aided skin disease diagnosis model is offered as a more objective and dependable option. Many studies have been conducted to aid in the detection of skin illnesses such as skin cancer and tumors. However, proper illness recognition is extremely difficult due to the following factors: low contrast between lesions and skin, visual similarity between the Disease and non-Disease areas, and so on. This research seeks

to detect skin disease from a skin image and analyse it by using a filter to reduce noise or undesired objects, converting the image to grey to aid in processing, and extracting valuable data. This can be used to demonstrate emergency orientation and provide evidence for any form of skin illness.

Literature Review

XieXiaoyun, Han Chaofei, ZengWeiqi1, ChenChen1, Lu Lixia, LiuQueping, PengCong, Zhao Shuang, Su Juan, ChenXiang [2018]

Possible Involvement of F1F0-ATP synthase and Intracellular ATP in Keratinocyte Differentiation in normal skin and skin lesions.

The present study strongly suggests a possible relationship between F1F0-ATP synthase, In ATP, and keratinocyte differentiation. It also provides new insights into the mechanism by which energy metabolism possibly regulates

Anthony Bewley [2018] The neglected psychological aspects of skin disease

Skin disease may elicit psychosocial comorbidities, and psychosocial stresses may elicit skin disease; a perfect spiral of cause and effect

Andre Esteva, Brett Kuprel , Roberto A, Susan M. Swetter, Helen M. Blau, Sebastian Thrun[2018] Dermatologist -level classification of skin cancer with deep neural networks Skin Cancer the most common human malignancy1–3,is primarily diagnosed visually, beginning with an initial clinical screening and followed potentially by dermoscopic analysis, a biopsy and histopathological examination.

Xinyuan Zhang, Shiqi Wang, Jie Liu and Cui Tao [2019] improving diagnosis of skin diseases by combining deep neural networkand human knowledge In this paper, we applied deep neural network algorithm to classify dermoscopic images of four common skin diseases and archived promising results. Based on the results, we further summarized the diagnosis/ classification scenarios, which reflect the importance of combining the efforts of both human expertise and computer algorithms in dermatologic diagnoses.

Yaron Gurovich1, Yair Hanani1, Omri Bar1, Guy Nadav1, Nicole Fleischer1, Dekel Gelbman1, Lina Basel-Salmon2,3, Peter M. Krawitz4, Susanne B. Kamphausen 5, Martin Zenker5, Lynne M. Bird6,7[2019] Identifying facial phenotypes of genetic disorders using deep learning we present a facial image a alysis framework, DeepGestalt, using computer vision and deep-learning algorithms, that quantifies similarities to hundreds of

syndromes. Deep Gestalt outperformed clinicians in three initial experiments, two with the goal of distinguishing subjects with a target syndrome from other syndromes, and one of separating different genetic subtypes in Noonan syndrome.

Andre Esteva1, Brett Kuprel1, Roberto A. Novoa2,3, Justin Ko2, Susan M. Swetter2, 4, Helen M. Blau5 & Sebastian Thrun6[2018] Dermatologist - level classification of skin cancer with deep neural networks The first case represents the identification of the most common cancers, the second represents the identification of the deadliest skin cancer. The CNN achieves performance on par with all tested experts across both tasks, demonstrating an artificial intelligence capable of classifying skin cancer with a level of competence comparable to dermatologists.

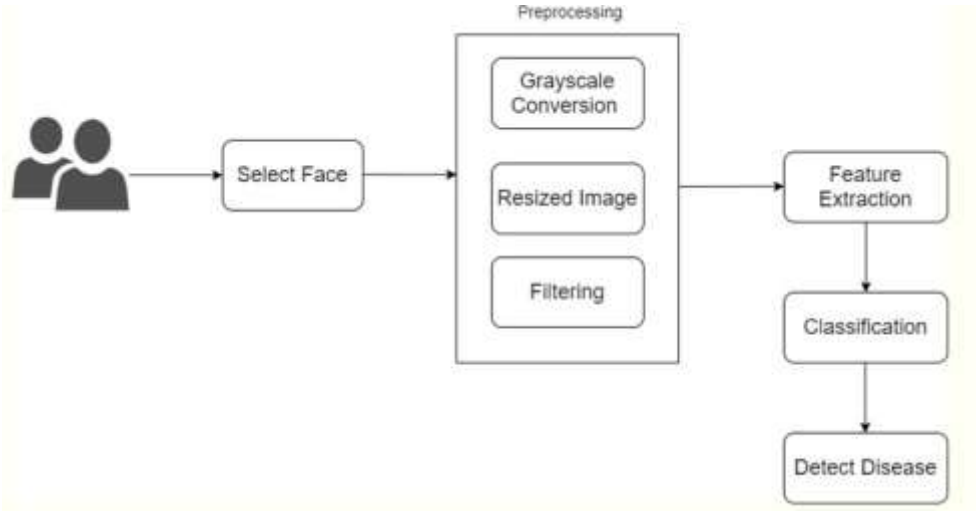
Xinyuan Zhang1, Shiqi Wang2, Jie Liu2* and Cui Tao [2018] Towards improving diagnosis of skin diseases by combining deep neural network and human knowledge

In this paper, authors applied deep neural network algorithm to classify dermoscopic images of four common skin diseases and archived promising results. Based on the results, we further summarized the diagnosis/ classification scenarios, which reflect the importance of combining the efforts of both human expertise and computer algorithms in dermatologic diagnoses.

R. J. Hay, N. E. Johns, H. C. Williams, I. W. Bolliger, R. P. Dellavalle, and D. J. Margolis [2015] The Global burden of skin disease in 2010: An analysis of the prevalence and impact of skin conditions Three skin conditions, fungal skin diseases, other skin and subcutaneous diseases, and acne were in the top 10 most prevalent diseases worldwide in 2010, and eight fell into the top 50; these additional five skin problems were pruritus, eczema, impetigo, scabies, and molluscumcontagiosum.

Skin diseases are the 4th common cause of skin burden worldwide. Robust and Automated system have been developed to lessen this burden and to help the patients to conduct the early assessment of the skin lesion. Mostly this system available in the literature only provide skin cancer classification. Treatments for skin are more effective and less disfiguring when found early and it is a challenging research due to similar characteristics of skin diseases. In this project we attempt to detect skin diseases .A novel system is presented in this research work for the diagnosis of the most common skin lesions (Melanocytic nevi, Melanoma, Benign keratosis-like lesions, Basal cell carcinoma, Actinic keratoses, Vascular lesion, Dermatofibroma). The proposed approach is based on the pre-processing, Deep learning algorithm, training the model , validation and classification phase. Experiments were performed on 10010 images and 93% accuracy is achieved for seven-class classification using Convolution Neural Networks (CNN) with the Keras Application API.

Existing System



DFD which shows how the information moves through the system and how it is modified by a series of transformations. It is the basic overview of the system. It is design to be an at a glance view of user , system and admin. It is a graphical technique that depicts information and the transformations that are applied as data moves from input to output.

Conclusion

Although though skin conditions are the fourth most common cause of sickness in people, many people still avoid seeing doctors. We provided a reliable and automated approach for the dermatological illnesses' diagnosis. When skin conditions are treated early on, they are less disfiguring and more successful. It is important to note that it is intended to replace doctors because no machine has yet been able to fully replicate human reasoning and intuition. For the first time, studies at the European Society of Medical Oncology have demonstrated that an AI or ML system may replace a skilled dermatologist. An overview of the system and the implementation process are provided here.

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Reference

[1] X. Xiaoyun, H. Chaofei, Z.Weiqi, C. Chen, L. Lixia, L. Queping, P. Cong, Z. Shuang, S. Juan, and C. Xiang, "Possible involvement of F1F0-ATP synthase and intracellular ATP in Keratinocyte differentiation in normal skin and skin lesions," Sci. Rep., vol. 7, Feb. 2017, Art. no. 42672.

[2] A. Bewley, "The neglected psychological aspects of skin disease," Brit. Med. J., vol. 358, p. 3208, Jul. 2017.

[3] A. Esteva, B. Kuprel, R. A. Novoa, J. Ko, S. M. Swetter, H. M. Blau, and S. Thrun, "Dermatologist-level classification of skin cancer with deep neural networks," Nature, vol. 542, pp. 115118, Feb. 2017.

[4] X. Zhang, S. Wang, J. Liu, and C. Tao, "Towards improving diagnosis of skin diseases by combining deep neural network and human knowledge," Med. Inform. Decis. Making, vol. 18, no. 2, p. 59, 2018.

[5] Y. Gurovich, Y. Hanani, O. Bar, G. Nadav, N. Fleischer, D. Gelbman, L. BaselSalmon, P. M. Krawitz, S. B. Kamphausen, M. Zenker, L. M. Bird, and K.W. Gripp, "Identifying facial phenotypes of genetic disorders using deep learning," Nature Med., vol. 25, pp. 6064, Jan. 2019.

[6] A. Esteva, B. Kuprel, R. A. Novoa, J. Ko, S. M. Swetter, H. M. Blau, and S. Thrun, ''Dermatologist-level classification of skin cancer with deep neural networks,'' Nature, vol. 542, pp. 115–118, Feb. 2017.

[7] X. Zhang, S. Wang, J. Liu, and C. Tao, ''Towards improving diagnosis of skin diseases by combining deep neural network and human knowledge,'' Med. Inform. Decis. Making, vol. 18, no. 2, p. 59, 2018.

[8] R. J. Hay, N. E. Johns, H. C. Williams, I. W. Bolliger, R. P. Dellavalle, and D. J. Margolis, ''The global burden of skin disease in 2010: An analysis of the prevalence and impact of skin conditions,'' J. Investigative Dermatology, vol. 134, no. 6, pp. 1527–1534, 2014.

[9] P. B. Manoorkar; D. K. Kamat; P. M. Patil"Analysis and classification of human skin diseases" IEEE Access 2016