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TITLE: A computer-aided diagnosis system for bullous disease based on deep learning

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ABSTRACT BODY:

Abstract Body: Bullous disease is a group of severe autoimmune dermatoses. the patients can have severe infections due to the destruction of the skin barrier. The treatment and prognosis vary with different types of bullous disease. In China, the missed and missing diagnosis of such diseases are very common since Chinese primary-care physicians generally lack dermatological diagnosis skills. To improve this status quo, we established a computer-aided diagnosis system for bullous diseases via fine-tuned InceptionResNetV2 (a convolutional neural network structure). By collecting patient clinical profile from Xiangya Hospital of Central South University for recent 10 years, we obtained a standard dataset called XiangyaDB, including 2288 clinical bullous diseases images accompanied with corresponding medical data. Compared with 6 existing public dermatology datasets (AtlasDerm, Dermatlas, Derm101, DermIS, Dermnet and Hellenicdermatlas, collectively called AtlasDB), our dataset is the largest clinical image dataset of bullous diseases worldwide. Considering clinical diagnosis requirement, our computer-aided system consisted of the preliminary classification of bullous diseases (pemphigus, pemphigoid and familial benign pemphigus) and the subtype classification of pemphigus (vulgaris, foliaceus and erythematous), called as stage 1 and stage 2, respectively. Both XiangyaDB and AtlasDB are used for training and testing. The mean accuracy of stage 1 and stage 2 are 82.98%, 86.40% for XiangyaDB and 82.73%, 79.08% for AtlasDB. Furthermore, our system is compared with 35 professional doctors on 60 patient images. The results show that the performance of our system is comparable to that of professional dermatologists. This study lays a foundation for further research and development of artificial intelligence diagnosis in bullous diseases. At last, we have published our diagnosis system on the website (<http://sugurs.gz01.bdysite.com/bullous/online-test>), which can provide tests for patients and primary doctors all over the world.

KEYWORDS: Bullous Disease, Clinical Research, Imaging.

CURRENT PREFERRED CATEGORY: Interventional Studies, Clinical and Patient Reported Outcomes | Skin, Appendages, and Stem Cell Biology

Academic-Industry Partnership Opportunity Y/N: Yes

Kligman app: (none)

Disclosure Agreement: Agree to all disclosure conditions.

Source of Support-Abstract: Institution

Associate Meeting Consideration: Yes

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Product version number 4.16.0 (Build 79). Build date Thu Mar 7 15:57:22 EST 2019. Server ip-10-236-26-45