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Using GANs Based Approaches to the Medical Image Applications - Dermoscopic Image Segmentation and Pressure Injure Prediction in Medical Care

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Since data generation can be made without clear modeling of the probability density function, the generative adversarial networks have attracted many regards in the medical image community. This has been proven to be useful in many medical image applications so that more GANs based approaches are proposed and adopted in medical image applications. Two medical image applications are investigated in this study which are the skin lesion segmentation in dermoscopy image and the pressure injure prediction in medical care. In the first application, the image of melanoma will be investigated. Because the shape of the skin varies widely and the boundaries are unclear, it is still a difficult task to segment skin lesions in dermoscopy images automatically. The proposed GANs based method (cG3FCA+2D) adopted the FCA-block in Unet, Dual-Discriminator, and the uncertain images transfer learning. The experimental results obtained by using the proposed method were based on the ISIC2017 and PH2 datasets. The next application is to build a GANs based model which can predict the pressure injure in critical care patients. The pressure injuries are a severe issue among critical care patients because most critical care patients are at high risk of endangering their lives. In this preliminary study, the proposed method can be used to predict whether the next stage will get better or worse based on the current wound images.

Experience:

Prof. Ta-Cheng Chen currently joins Asia University as a Chair Professor, Vice President, Dean of Academic Affairs, and the Director of 3D Printing Medical Research Institute. His research interests include applied AI in optimization, production management, decision analysis, management information system, big data analysis and mining, 3D printing in Medical applications. He published his research articles mostly in the field of optimization and data mining by uses of AI related approaches, such as reinforcement learning approach, genetic algorithm, artificial immune system, PSO and the hybrid approaches etc. His working experience is as follows:

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