

Skin lesion classification and segmentation

DeepHealth

Skin cancer is the most common form of cancer worldwide, representing a major public health issue. Early diagnosis of skin lesions is fundamental to lowering the mortality rate. However, physicians cannot manually study all the variabilities in sizes, shades and textures of skin, whereas Deep Learning algorithms can, greatly supporting clinicians in early diagnosis.



Challenge

Early detection of all skin cancers is one of the key factors in preventing their progression to advanced stages, constituting the ideal solution to fight against skin tumor consequences. Early detection requires a huge amount of examinations and images for dermatologists to evaluate as quickly as possible.

Dermoscopic images are the most common imaging technique to get an early diagnosis. However, they have to be analyzed by clinicians with extensive experience, due to the high variability in sizes, shades and textures of skin lesions.

To support their work, there have been great efforts towards the creation of tools for their automatic analysis; in particular, Deep Learning.

Solution

Skin lesion segmentation, which recognizes the lesion's set of pixels, is a fundamental step in the melanoma detection process, Automatic segmentation mitigates the need of medical manually annotated data, which is extremely time consuming. A proper segmentation can boost the classification of skin lesion images.

With the DeepHealth toolkit, the dermatologist can upload their patient's skin lesion microscopic image and have a hint on how the neural network trained on thousands of images would segment and classify it and with which confidence rate.

Benefits

DeepHealth Toolkit can boost lesions' early diagnosis thanks to this rapid and automatic identification of diagnostic clues, which can facilitate image interpretation and diffusion of technologies among other doctors.

As it has been reported (Hekler, Achim, et al. "Superior skin cancer classification by the combination of human and artificial intelligence." *European Journal of Cancer*), combining human and artificial intelligence accomplishes a better classification of images compared to only dermatologists' classification. This enhanced decision-making can lead to rapid improvement in skin cancer early diagnosis and treatment.

Medical specialty:
Dermatology

Use Case:
Skin cancer

Site:
Modena (Italy)

Entity:



Skin lesion segmentation

DeepHealth Project

DeepHealth is a H2020 collaborative project which develops new HPC and Deep Learning techniques applied to large and complex biomedical datasets to support new and more efficient ways of diagnosis of diseases. The technologies developed (EDDLL, ECVL, etc.) have been validated by clinicians on 14 Use Cases like this, providing 14 Success Stories ready to scale to other healthcare institutions.