PROJECT REPORT

Segmentation of Chronic Wounds

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1 Introduction

1.1 Motivation

- Why is automatic Wound Segmentation so important? And why is it a complex problem?
- Manual segmentation by experts very time consuming
- experts differ in their segmentation
- changing lighting conditions, distance to camera, different cameras have impact on result
- controlled environment not feasible in clinical setting
- ideally, we want to be able to take pictures with a smartphone without overly complicated instructions for the person taking the picture
- experience as photographer should not be required, clinical proffessionals should be able to take pictures that are then segmented correctly

1.2 Research Questions

- can the results be reproduced?
- what influence does the input image size have? Can we rescale the images and are able to transfer what is learned
- how robust is the model/architectures to transformations/distortions on the input
- XAI

2 Dataset

- not many medical datasets on chronic wounds publicly available [2]
- often focus on specific type of chronic wounds - TODO: which one was over-represented again?
- used dataset consists of 2686 wound images with their corresponding masks introduced by Oota et al. [2].
- 8 different wound types represented in dataset: venous ulcer, trauma wound, diabetic ulcer, surgical wound, arterial ulcer, cellulitis, pressure ulcer and a not further specified group of other wounds
- unfortunately, the wound classification is not available

3 State of the Art

4 Technical Information

4.1 Prior Experience

I have a strong programming background, consisting of a B.Sc. in Computer Science and three years of work experience in Web Developement with Python. Beside the content of the course Advanced Concepts of Machine Learning, I have no prior experience with Deep Learning.

4.2 Code and Data Availability

The code produced in the scope of the project is available on GitHub: `https://github.com/Zianor/DLIV-chronic-wound-segmentation`. Package versions are included to ensure reproducability.

The used data is available on GitHub as well: `https://github.com/subbareddy248/WSNET/` [1, 2]. Availability on a later point of time cannot be guaranteed.

4.3 Used Hardware

All computations are performed on a MacBook Air (24 GB RAM, Apple M2 Chip with an 8-core GPU). The package versions for GPU-utilization on MacOS are included in the package versions on GitHub.

References

[1] Subba Reddy Oota et al. "HealTech - A System for Predicting Patient Hospitalization Risk and Wound Progression in Old Patients". In: *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*. Jan. 2021, pp. 2463–2472.

[2] Subba Reddy Oota et al. "WSNet: Towards an Effective Method for Wound Image Segmentation". In: *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*. Jan. 2023, pp. 3234–3243.