Wound Stage Classification using Spatio-Temporal Attention Few-shot Learning

A new theoretical framework to approach wound stage estimation

CSE 247 - Projects in Artificial Intelligence
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Overview

Processing wound images has been revisited very recently with the aim to use deep learning algorithms to detect wound and to give it's size estimation [1]. However, with the medical need to identify wound stage, a classifer of wound images into wound stages became essential. It would help physicians to give the right treatment at the right time. Few-shot learning has recently received a lot of attention in video classinfaction due to it's potential to reduce video annotation cost significantly [2]. Few-shot classification aims to learn a classifier to recognize unseen classes during training with limited labeled examples [3]. And since it reduces the cost of video annotation, we aim to work on a new theoretical framework as a new approach to estimate wound stage. We will work on the dataset of C57BL/6J mice [1], and creating a customized version of a previous work on Classification using Spatio-Temporal Attention Few-sot Learning [2].

Dataset

The dataset we will use in this project will be of C57BL/6J mice. Photographs of 15-day wound closure progress [1]. It's collected on 2019 Feb-March. The dataset includes left and right wound for 16 days and it's cropped copies.

Timeline

Week **3 - 4**

- Read, run and test MASTAF framework code, link
- Setup a GPU account
- Read Automatic Wound Detection . . paper, link
- Create image/video augmentation for wound dataset, link
    - In multiple stages as much as needed
- Make a baseline of the model
- Paper review

Week **5**

- Learn and build on top of baseline
- Create a progress report

Week **6**

- Work on feedback of progress report
- Paper review

Week **7 - 8**

- Make experiments
- Generate tables and figures for project report
- Paper review

Week **9 - 10**

- Create a project report
- Email Professor Marcella Gomez the project report
- Create a project presentation

References

1. Yang, Hsin-ya; Bagood, Michelle; Carrion, Hector; Isseroff, Rivkah (2022), Photographs of 15-day wound closure progress in C57BL/6J mice, Dryad, Dataset, https://doi.org/10.25338/B84W8Q
2. Liu, Rex; Zhang, Huanle; Pirsiavash, Hamed; Liu, Xin (2022), MASTAF: A Model-Agnostic Spatio-Temporal Attention Fusion Network for Few-shot Video Classification. University of California, Davis. https://arxiv.org/pdf/2112.04585.pdf.
3. Chen, Wei-Yu, et al. “A Closer Look at Few-Shot Classification.” *Google Sites*, 2019, https://sites.google.com/view/a-closer-look-at-few-shot/.