Title

Identifying Skin Cancer: Detection Using CNNs

Group Members

Pedro Silva – nº 64926
Pedro Diz – nº 64852

What problem will be investigated, and why is it interesting?

Portugal has a hot climate and extensive beach culture, leading to high sun exposure, which significantly increases the risk of skin cancer (https://www.ipolisboa.min-saude.pt/noticias/cancro-da-pele-e-dos-mais-frequentes-em-portugal/).

Early detection is crucial, as it greatly improves the chances of successful treatment while reducing long-term damage and increasing survival rates (https://www.cas.org/resources/cas-insights/how-biomarkers-unlock-faster-cancer-detection-improving).

What sources will be reviewed to provide context and background?

We will review medical research papers and scientific literature on the application of deep learning, specifically convolutional neural networks (CNNs).

What data will be used? If new data is collected, how will it be gathered?

We will use large, publicly available image datasets such as the ISIC Archive and HAM10000. At this stage, we do not have a defined strategy for collecting new data.

What method or algorithm will be used?

The proposed method will be based on convolutional neural networks (CNNs) for binary image classification (benign vs malignant).

If existing implementations are available, will they be utilized, and how?

Existing implementations from popular frameworks such as PyTorch or TensorFlow can be used for testing and as a basis for comparison with our own architecture. If any ideas from these implementations are found to be beneficial, they may be integrated into our model.

How will the results be evaluated? Qualitatively, what kinds of results are expected (e.g., plots or figures)? Quantitatively, what kind of analysis will be used to evaluate and/or compare the results (e.g., performance metrics or statistical tests)?

Qualitative analysis:

A confusion matrix will be used to identify the most frequent types of errors.
We also plan to visualize examples of correct and incorrect predictions, based on the validation/test image set.

Quantitative analysis:

We will use standard performance metrics such as accuracy, precision, recall, F1-scores to evaluate the model.
In addition, we will monitor the loss function throughout the training process.