**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.