ARTIFICIAL INTELLIGENCE IN MELANOMA DIAGNOSIS - PAIRED IMAGE INPUT

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ABSTRACT

Machine Learning gives the possibility to provide early diagnosis methods for Melanoma. Unfortunately, current implementation is not safe for use. This study will attempt to increase the accuracy of machine learning models by training with paired images as inputs rather than single images.

ML - BACKGROUND

The most common method to perform analysis on images is using a deep learning model. Deep learning is a sub branch of artificial intelligence in which human experts do not contribute to the classification of images. More explicitly, the computer detects features with parameters of its own creation.

To analyze images with a neural network, a convolutional neural network is used. First, the image is converted into a 3 dimensional matrix of numbers. Each entry in the matrix represents an rgb value of the image. Afterwards, the image passes through an analysis algorithm and is reduced into a vector of n features. This vector is then dotted with a vector of n weights returning a real number between 0 and 1, the model’s prediction.

RESULTS

In comparing accuracy and loss between the baseline model and the paired image model, the results showed improved accuracy (binary correctness of prediction) and reduced loss (a measurement of error) from the paired image model. With respect to loss, the paired image model performed better. The lowest loss achieved by the baseline (i.e. unpaired) model was 0.7992, substantially higher than the 0.6785 achieved by the paired images model.

HEALTH APP PREVIEW

AI offers preliminary diagnosis

FUTURE WORK

Currently, I am still working on implementing my research into an app that uses users to further improve datasets and making machine learning safe for preliminary melanoma diagnosis.