

# Advancing Automated Skin Cancer Detection

Leveraging Machine Learning for Accurate Skin Cancer Detection

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# Introduction

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- Dermatoscopic images are critical for developing accurate machine-learning models that can assist in diagnosing various skin conditions.



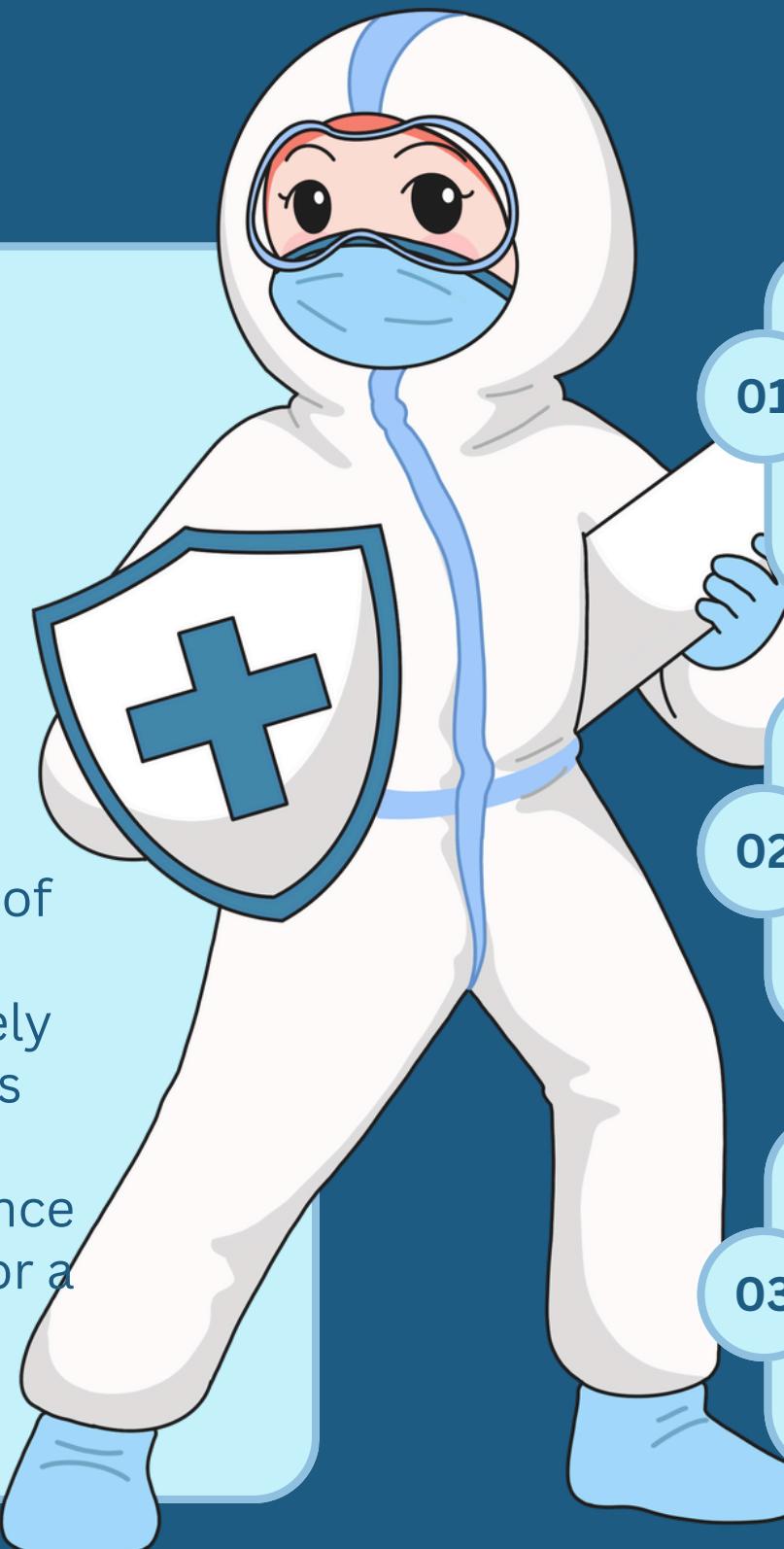
# Introduction

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- Dermatoscopic images are critical for developing accurate machine-learning models that can assist in diagnosing various skin conditions.
- However, without a sufficiently large and diverse dataset, the neural networks may not perform well across different populations and types of lesions, leading to less reliable diagnostic tools.



# Project objectives

This project aims to develop and refine neural networks for the accurate boundary segmentation of pigmented skin lesions in dermatoscopic images. By precisely identifying and outlining the edges of lesions, the project seeks to enhance the diagnostic performance of automated systems, allowing for a more reliable distinction between benign and malignant lesions.



01

Precise boundary segmentation can aid dermatologists in planning treatment by providing accurate measurements of lesion size and shape, which are critical for surgical excision and monitoring treatment progress.

02

The project's outcomes can serve as valuable educational tools for training medical students and residents in dermatology, offering them high-quality examples of various skin lesions and their boundaries.

03

The improved diagnostic tools developed using this dataset can lead to earlier and more accurate detection of skin cancers and other pigmented lesions, potentially improving patient outcomes through timely and appropriate treatment.

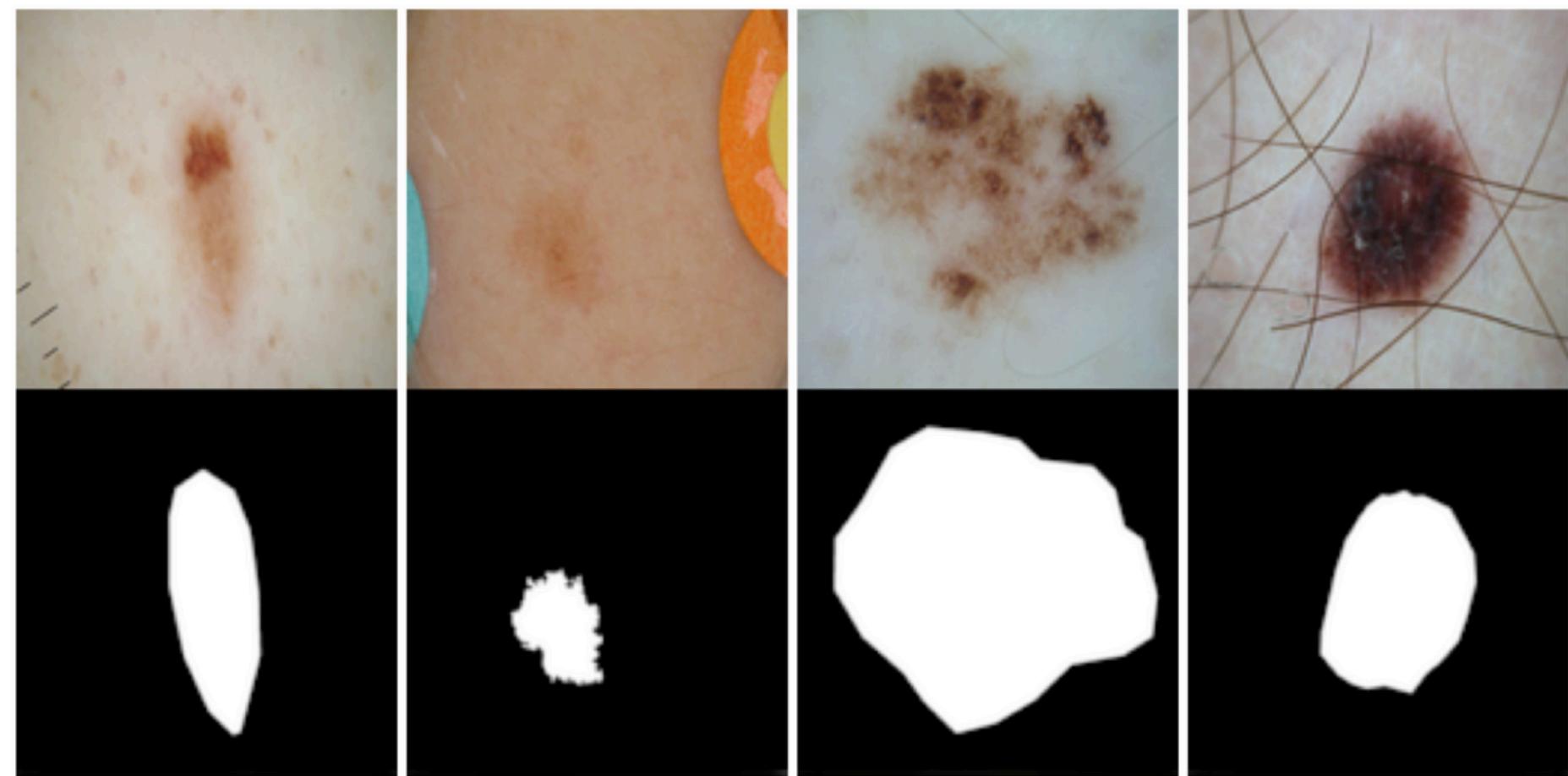
# Dataset Overview

The dataset consists of 2 lesion image folders named using the ISIC\_<image\_id>.jpg scheme, where <image\_id> is a 7-digit unique identifier.

- A metadata file that summarizes all the data and connects them with Lesion ID and Image ID.
- The result is a mask having the same dimension as the lesion image with the following pixels.
- 0: representing the background of the image, or areas outside the primary lesion
- 255: representing the foreground of the image, or areas inside the primary lesion

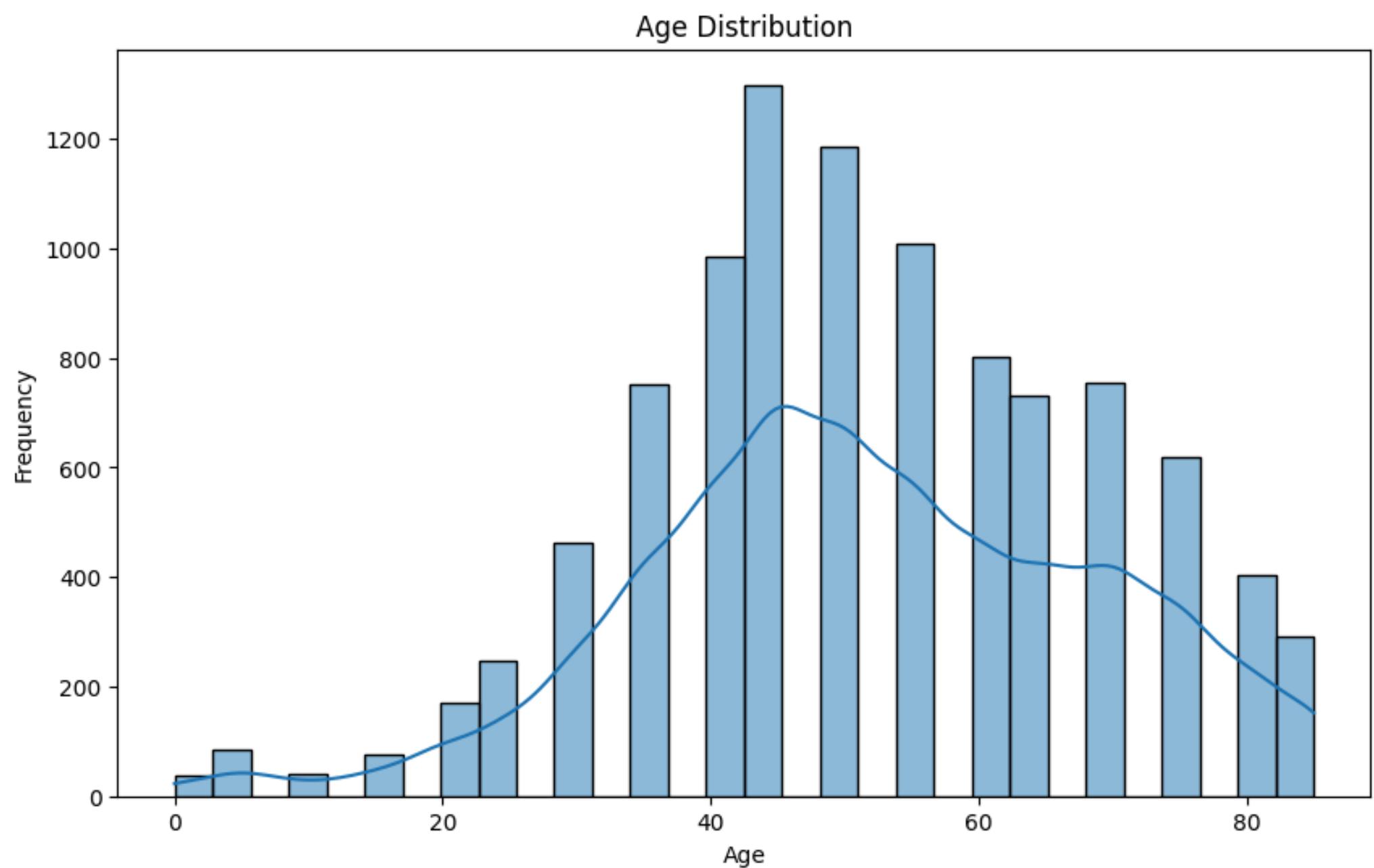


# Goal



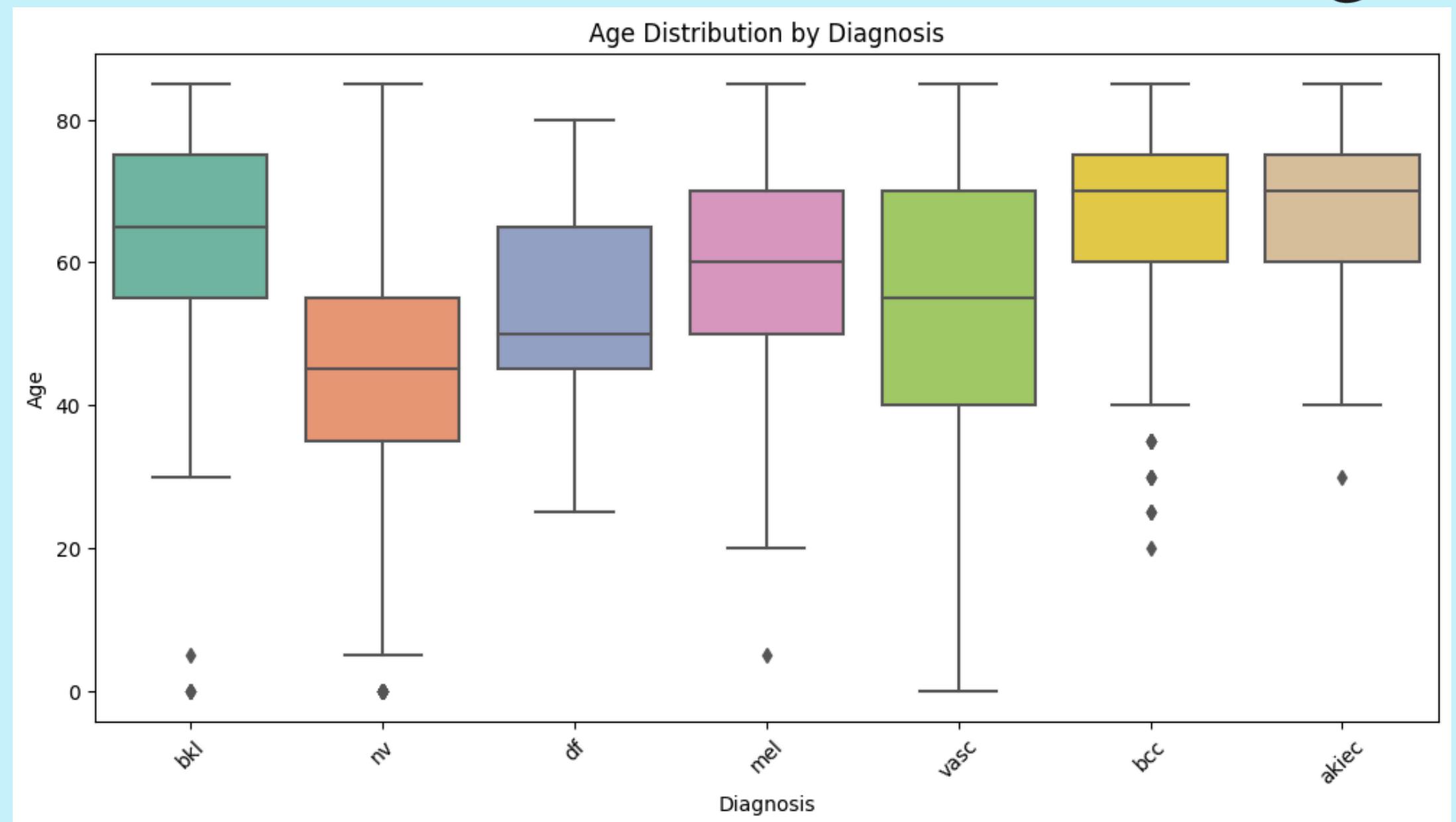
# Insights

Age - Diagnosis



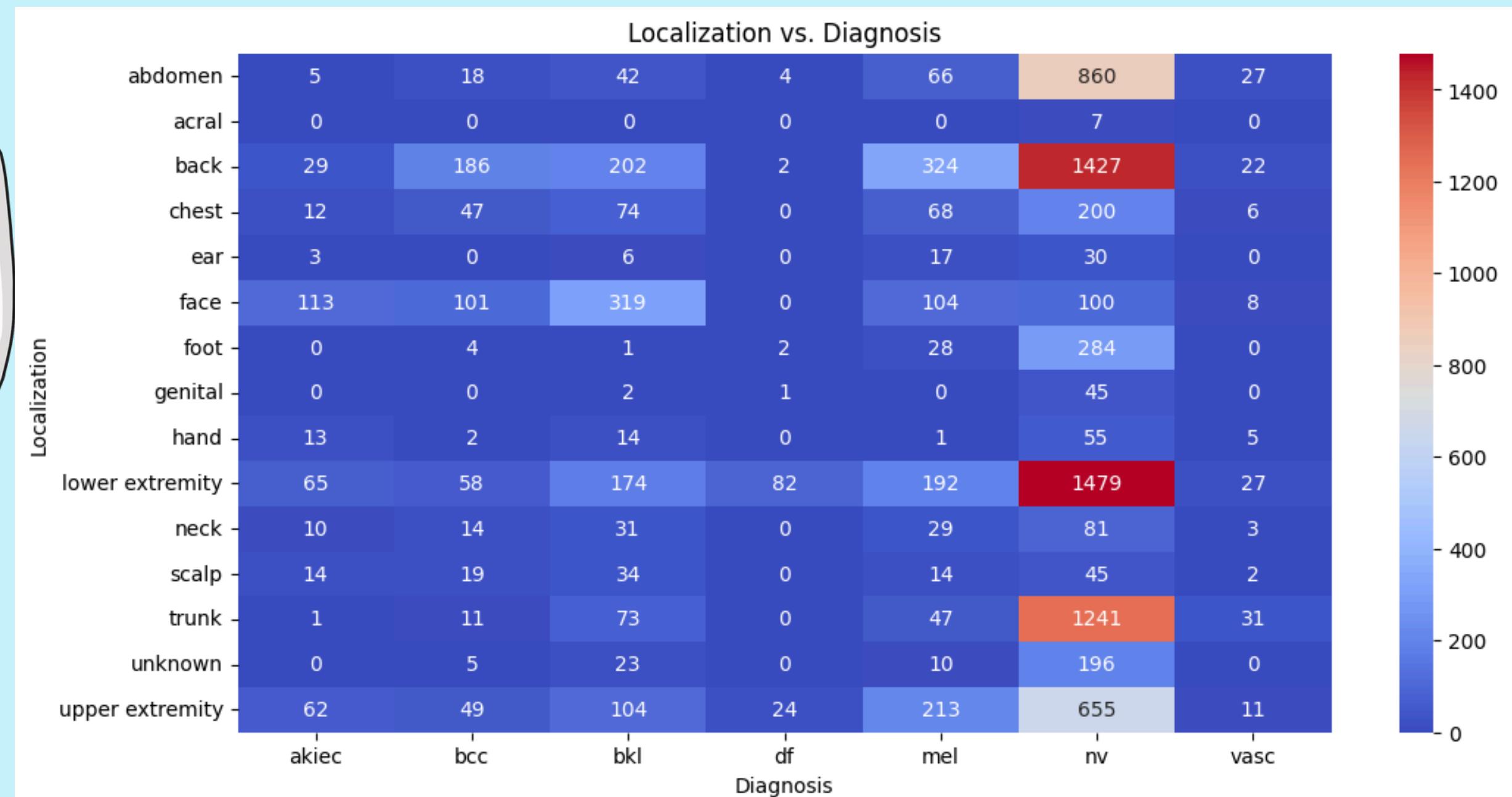
# Insights

## Age - Diagnosis



# Insights

## Localization - Diagnosis



# Next Steps



## Modeling

This project will be done by implementing the U-net Architecture for image segmentation



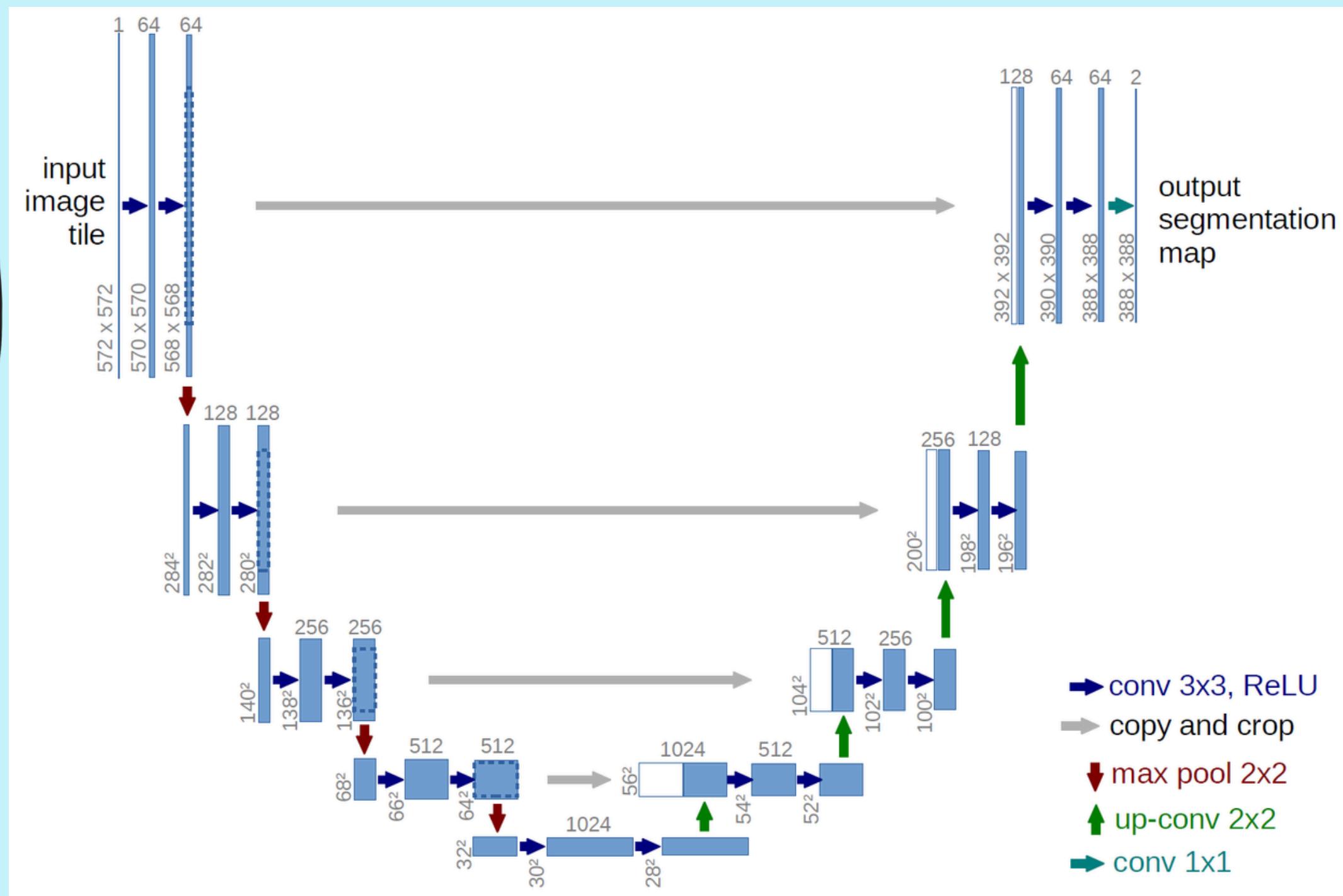
## Model Evaluation

Predicted responses are scored using a threshold Jaccard index metric.



# U-net Architecture

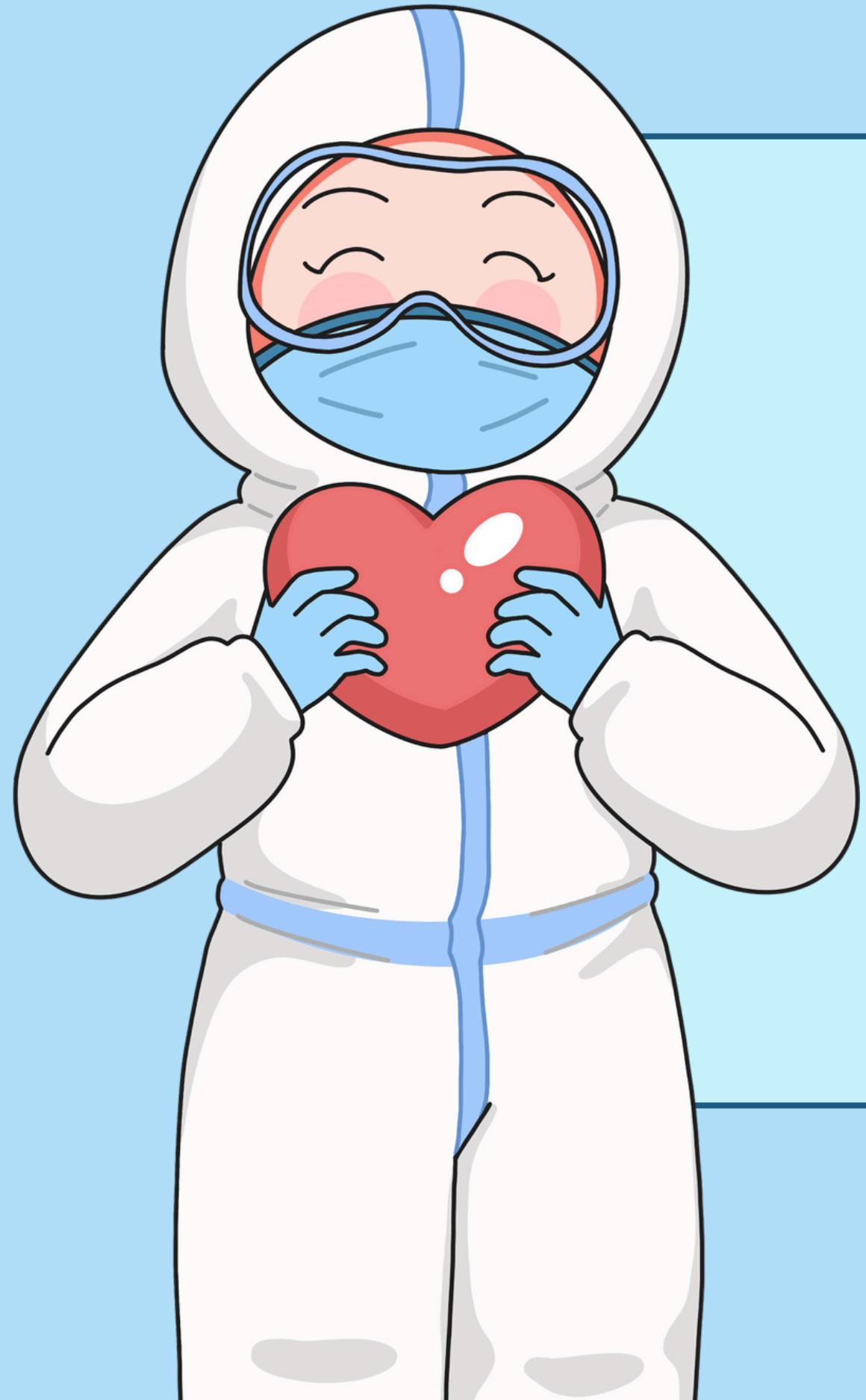
## Image Segmentation



# References

- U-net Architecture : <https://lmb.informatik.uni-freiburg.de/people/ronneber/u-net/>
- Dataset via Paul S.:  
[https://www.kaggle.com/datasets/kmader/skin-cancer-mnist-ham10000?resource=download&select=HAM10000\\_metadata.csv.](https://www.kaggle.com/datasets/kmader/skin-cancer-mnist-ham10000?resource=download&select=HAM10000_metadata.csv)
- Model Evaluation: <https://challenge.isic-archive.com/landing/2018/45/>





# THANK YOU!

Questions ?